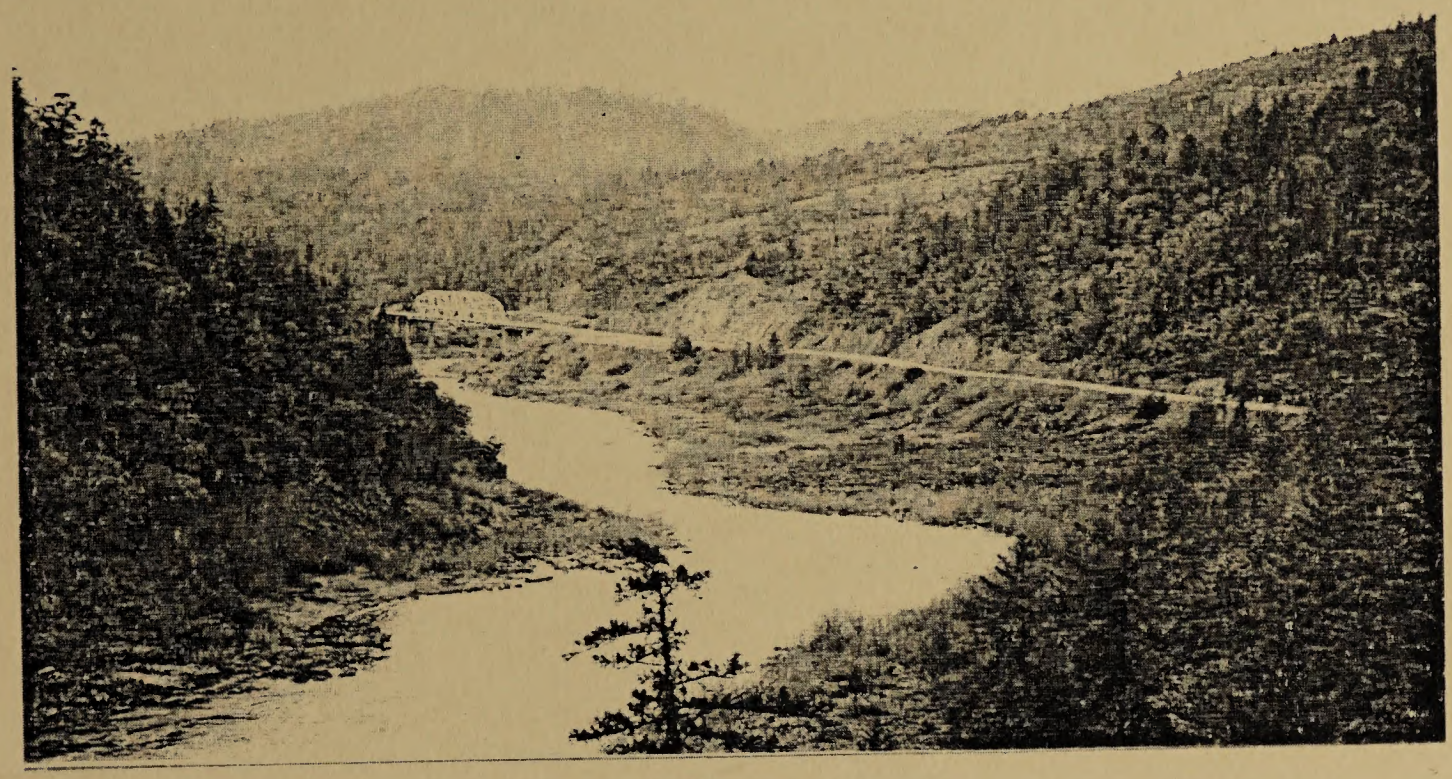
Rogue-Recreation Section Watershed Analysis



Hellgate Bridge along the Rogue River

REO Fifth Field Watershed #1710031001

U.S. Department of the Interior
Bureau of Land Management
Medford District
Grants Pass Resource Area

January 1999

1/9/99 - Version 1.0

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BLM/OR/WA/PL-99/038+1792

ROGUE

- RECREATION SECTION -

WATERSHED ANALYSIS

(REO Fifth Field Watershed #1710031001)

(*aka*, the BIG HOG Watershed)

JANUARY 1999

U.S. Department of the Interior
Bureau of Land Management
Medford District
Grants Pass Resource Area

January 1999

Dear Reader:

The purpose of this watershed analysis is to identify the various ecosystem components in the Rogue - Recreation Section fifth-field watershed and their interactions at a landscape scale. It looks at historical ecological components, current ecological components and trends. It makes recommendations for future management actions that could be implemented to reach recommended ecological conditions.

The fifth watershed that is being analyzed in this document is designated as the Rogue - Recreation Section (Watershed #1710031001). It is sometimes referred to as the "Big Hog Watershed" reflecting its inclusion of Hog Creek.

As you read this document, it is important to keep in mind that the watershed analysis process is an iterative and ongoing process. As new information becomes available it will be included and updating will occur. It is also important to keep in mind that **this analysis document is <u>not</u> a decision document**. The recommendations that are included are a point of departure for project specific planning and evaluation work. Project planning then includes the preparation of environmental assessments and formal decision records as required by the National Environmental Policy Act (NEPA). Project planning and land management actions would also be designed to meet the objectives and directives of our Medford District Resource Management Plan (RMP).

This watershed analysis will thus be used as a tool in land management planning and project implementation within the Rogue - Recreation Watershed on Bureau of Land Management (BLM) administered lands. Although ecological information, discussions and recommendations are presented at the landscape scale irrespective of administrative ownership, please understand that the BLM will only be implementing management actions on the lands it administers.

Preparation of the watershed analysis follows the format outlined in the draft federal watershed analysis guidelines in the document entitled *Ecosystem Analysis at the Watershed Scale: Federal Guide for Watershed Analysis* (Version 2.2, August 1995).

If you have additional resource or social information that would contribute to our better understanding the ecological and social processes within the watershed, we would appreciate hearing about them.

Robert C. Korfhage
Field Manager
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INTRODUCTION

Preparation of watershed analyses is a key part of the implementation of the 1994 Northwest Forest Plan (NFP). It is conducted at a fifth field watershed scale and is a procedure with the purpose of developing and documenting a scientifically-based understanding of the ecological structure, functions, processes and interactions occurring within a watershed. It is one of the principal analysis used to meet the ecosystem management objectives of the NFP's Standards and Guidelines. It is an analytical process, not a decision-making process. A watershed analysis serves, in part, as a basis for developing project-specific proposals and monitoring and restoration needs of a watershed. The watershed analysis process is designed to be a systematic procedure for characterizing watershed and ecological processes to meet specific management and social objectives.

This watershed analysis will thus document the past and current conditions of the Rogue Recreation Section watershed (*aka* Big Hog), both physically and biologically. It will interpret the data, determine trends, and make recommendations on managing this watershed toward the desired future condition.

The first part of this analysis will address the core physical, biological and human features that characterize the watershed and their important ecological functions. Regulatory constraints that influence resource management in the watershed will also be identified. From this, key issues will be identified that will focus the analysis on the important functions of the ecosystem that are most relevant to the management questions, human values, or resource condition within the watershed.

Next, current and reference conditions of these important ecosystem functions will be described. An attempt to explain how and why ecological conditions and processes have changed over time will be made during the synthesis portion of the analysis.

The final portion of the analysis identifies the recommendations for the Rogue - Recreation Watershed taking into account land management constraints and the demand for the watershed's resources. These recommendations will guide the management of the watershed's resources toward the desired future condition.

Two key management documents are frequently referred to throughout this analysis. These are:

1. *The Record of Decision for Amendments to the Forest Service and Bureau of Land Management Planning Documents within the Range of the Northern Spotted Owl* and its Attachment A, entitled *the Standards and Guidelines for Management of Habitat for Late-Successional and Old-Growth Forest Related Species within the Range of the Northern Spotted Owl* (April 13, 1994), **(NFP)**;

2. The *Record of Decision and Resource Management Plan* for the Medford District (June 1995) **(RMP)**.

Rogue - Recreation Watershed Analysis Team Members

The following resource professionals worked as members of the watershed team:

Tom Dierkes	–	Vegetation
Janet Kelly	–	Vegetation
Matt Craddock	–	Cultural/Minerals
John Moore	–	Aquatic Habitat/Fisheries
Jeanne Klein	–	Recreation
Jim Roper	–	Roads/Quarries
Dave Maurer	–	Soil/Water and Team Lead
Linda Mazzu	–	Botanical, Special Status Plants
John McGlothlin	–	GIS
Tom Murphy	–	Fuels and Fire
Kip Wright	–	Terrestrial Wildlife Species and Habitats

I. CHARACTERIZATION

A. PURPOSE

The purpose of this, the Characterization section, is to identify the dominant physical, biological and human processes and features of the watershed that affect ecosystem function or condition; to relate these features and processes with those occurring in the river basin or province; to provide the watershed context for identifying elements that need to be addressed in the analysis; and to identify, map and describe the land allocations, the forest plan objectives and the regulatory constraints that influence resource management in the watershed. (*Federal Guide for Watershed Analysis*, Version 2.2, 1995)

B. INTRODUCTION

The Rogue - Recreation Watershed is located within the Klamath Mountain Physiographic Province of southwestern Oregon in Josephine County approximately five miles west of the city of Grants Pass (see Map 1 in Appendix A; all maps are in Appendix A). Approximately 14 million years ago this area began uplifting and has been shaped, primarily by water, into a mountainous terrain with a narrow valley floor. This surface ranges in elevation from 860 feet to near 4,450 feet. It has nearly 354 miles of waterways, not including Forest Service-administered lands, that drain into and include the Rogue River. Approximately 18% of these waterways provide habitat for salmonids. The watershed's soils formed from Klamath Province meta-volcanic, meta-sedimentary, and small amounts of granitic rocks. The soil supports diverse forest vegetation types. The forests supply wood, recreation, and other special products for human purposes while providing habitats for many species of terrestrial and aquatic wildlife and plants. People have settled and developed the toeslopes of the mountains and along valley floors.

C. CLIMATE

The Rogue - Recreation Watershed has a Mediterranean climate with cool, wet winters and warm dry summers with a strong coastal influence. Average annual precipitation in the watershed ranges from approximately 33 inches in the southeast portion to 104 inches in the far west portion. The Sexton Summit Weather Station is located about seven miles to the east of the Rogue - Recreation northeast boundary at an elevation of 3,836 feet. Temperature records at Sexton Summit show the lowest average monthly minimum occurs in January at 30.5° F. The highest average monthly maximum temperature occurs in July at 75.1° F. This correlates to temperatures at high elevations within the Rogue - Recreation Watershed. Temperatures recorded at the Grants Pass Weather Station show the lowest monthly minimum average occurs in January with a temperature of 32.3° F. The highest average monthly maximum in Grants Pass occurs in July at 89.8° F. This correlates to lower to temperatures at lower elevations within the Rogue - Recreation Watershed.

D. OWNERSHIP

The Rogue - Recreation Watershed Analysis addresses all lands within the 93,316 acre Rogue - Recreation

fifth-field watershed. Table I-1 notes the general land ownership distribution within the watershed.

Table I-1: Land Ownership in the Rogue - Recreation Watershed

Land Ownership/Administration	Acres	Percent of Total
BLM	37,678	40%
U.S. Forest Service	30,064	32%
State of Oregon	1,259	1%
Josephine County	4,436	5%
Private	19,879	21%
Watershed Total	**93,316**	

Map 2 (Appendix A) shows the location of BLM and other government-administered land in the watershed.

The Northwest Forest Plan (*Record of Decision for Amendments to Forest Service and Bureau of Land Management Planing Documents within the Range of the Northern Spotted Owl, and Standards and Guidelines for Management of Habitat for Late-Successional and Old-Growth Forest Related Species within the Range of the Northern Spotted Owl,* April 1994)) and the Medford District's Resource Management Plan (June 1995) made a variety of land use allocations as a framework within which federal land management objectives vary. Together, they are designed to meet the broader objectives of the regional plans. Table I-2 summarizes these allocations as they occur within the Rogue - Recreation Watershed. Map 3 shows the location of the federal land allocations on BLM land in the watershed.

Table I-2: Land Status - Land Allocations (NFP & RMP) on BLM-Administered Lands

Land Use Allocation	BLM Acreage	Percent of BLM in Watershed	
Congressionally Reserved Areas	4,898	13%	Rogue Wild and Scenic River Corridor, Recreation Section
Late-Successional Reserves	13,564	36%	
Adaptive Management Areas	0		
Administratively Withdrawn Areas	0		
Riparian Reserves	--		Acreage not determined, included in other allocations
Matrix	19,216	51%	
TOTAL - BLM	**37,678**		

The Rogue - Recreation Watershed is a non-key watershed with most of the federal lands being designated

as "Matrix" under the NFP. Matrix consists of those federal lands outside the six categories of designated areas: Congressionally Reserved Areas, Late-Successional Reserves, Adaptive Management Areas, Managed Late-Successional Reserves, Administratively Withdrawn Areas, and Riparian Reserves. The matrix allocation is where most timber harvest and other silvicultural activities are conducted. It is where the scheduled timber harvest activities will be located. In addition to managed forests, the matrix includes both non-forested areas and forested areas that are technically unsuitable for timber production. These unsuitable areas do not contribute to the timber landbase upon which the Probable Sale Quantity (PSQ) is determined. Probable sale quantity estimates the sustainable harvest level given the management decisions of the RMP.

Riparian Reserves, which protect aquatic and late-successional forest habitats, border all the streams throughout the matrix. These areas are a critical part of the NFP's Aquatic Conservation Strategy to restore and maintain the ecological health of watersheds and aquatic ecosystems. The main purposes of the reserves are to protect the health of the aquatic system and its dependent species and to provide benefits to upland species. These reserves help maintain and restore riparian structures and functions, benefit fish and riparian-dependent non-fish species, enhance habitats for organisms dependent on the transition zone between upslope and riparian areas, improve travel and dispersal corridors for terrestrial and aquatic animals and plants, and provide for greater connectivity of late-successional forest habitats (NFP, p.7).

E. REGULATORY CONSIDERATIONS

Important federal laws pertinent to management of the federal lands in the watershed include: The Clean Water Act, National Environmental Policy Act (NEPA), Federal Land Policy and Management Act (FLPMA), the National Historic Preservation Act (NHPA), Endangered Species Act (ESA), Clean Water Act (CWA), National Wild and Scenic Rivers Act, and the Oregon and California Lands Act (O&C Act).

F. EROSION PROCESSES

The dominant erosion processes occurring in this watershed are concentrated flow erosion (sheet/rill erosion and gully erosion), stream channel erosion, and mass wasting. Areas that may be susceptible to these kinds of erosion when not protected are shown on Map 4 (Interpreted from Soil Conservation Service, 1979). Erosional processes within the landscape are driven by gravity and the influence of water (precipitation and runoff) on soil shear strength. Other factors that have influenced the erosion process on the landscape are climate, vegetation and fire. Water erosion is important as it not only detaches soil particles (and sometimes earthen material), but also transports the material downhill.

Concentrated flow erosion is a concern on hill slopes that have had most of the vegetation removed and where roads have concentrated runoff in unconsolidated ditches and diverted it to where surface protection is inadequate. Soil erosion occurs when soil particles are detached by raindrop splash or the overland flow of water and moved to another location on the landscape. Eroded soil particles can move from less than an inch to many miles depending on the topography and vegetative condition of the land. This erosion is of concern because it can reduce the amount of soil on a landscape, thus decreasing the productivity of the

land and increasing sediments in local waterways.

Channel erosion occurs as large volumes of water and debris rush through the waterways dislodging soil particles from the streambanks and transporting them downstream. This type of erosion is important as it can widen a stream channel which may cause the stream to spread and become shallower. Also, the detached soil sediments may deposit in fish spawning gravel or rearing pools reducing habitat effectiveness. High road densities may activate this type of erosion because of increased peak flows that is caused (see Road Density section below). Deep, fine textured soils that occur at the base of upland areas on fans, footslopes and terraces are most susceptible to channel erosion.

Mass movement processes in the Rogue - Recreation Watershed occur in different forms. These forms are raveling on steep slopes, soil creep, earthflows, slumps and debris slides. These phenomenon occur on different portions of the landscape and under different conditions but most involve water saturated soil moving downhill. This type of erosion is important as many tons of soil may be lost on the hillside. The soil moving downhill eventually reaches a stream or waterway and can have detrimental affects. Soils that commonly occur in the watershed have steep slopes coupled with depth and fine texture. These soils are indicative of mass movement potential.

These erosional processes combined with the uplifting of the landscape that has been occurring for the last 14 million years are primarily responsible for the morphological characteristics of the watershed. As the landscape is uplifted, belts of varying rock types are exposed to weathering. The uplifting process occurred faster than the erosional process which has resulted in steeply incised stream canyons streams (draws) with high gradients in most of the watershed (Rosgen Aa+) and alluviated valley streams with low to moderate gradients and entrenched channels (Rosgen B and F). Riparian areas along these streams provide habitats for plants and animals associated with the aquatic resources. Many of the riparian areas of the streams in the watershed have been disturbed as a result of past timber harvest, roads or fire.

Road density is the measurement of total road length for a given area, commonly miles of road per square mile. The Rogue - Recreation Watershed has highly variable road densities from low to high. Road density and future road development is a concern because, generally, roads intercept surface water and shallow groundwater and route it to natural drainageways. This concentrates and increases natural runoff and may cause erosion. It may bring sediment to the stream system. Peak stream flows may increase compared to stream flows in areas with few or no roads. Increase peak flows may increase streambank erosion. Road densities in excess of four miles per square mile are considered a high level and will have detrimental cumulative effects on stream water quality and quantity. Two subwatersheds with a high road density are Hog Creek and Picket Creek.

G. HYDROLOGY

There are approximately 457 miles of streams in the non-Forest Service portion of the Rogue - Recreation Watershed. The headwaters of these streams are generally steep and fast flowing. The stream flow in the Rogue - Recreation Watershed fluctuates with the seasonal variation in rainfall. Peak flow events occur during high intensity storm events of long duration, usually in the winter and early spring. The flows of

the Rogue River in this watershed are heavily affected by storm events, snow melt, and releases or detention of the Lost Creek and Applegate Dams. The are no stream gauges in this watershed. The maximum recorded discharge for the Rogue River in Grants Pass was 152,000 cubic feet per second (cfs) on December 23, 1964 (USGS 1997). The Applegate floods of December 22, 1964 and January 15, 1974 were higher than the highest recorded discharge, December 22, 1955, of 66,500 cubic feet per second near Wilderville. The maximum recorded discharge after flow regulation by Lost Creek Dam (beginning February of 1977) was 90,800 cfs on January 1, 1997. The maximum recorded discharge after flow regulation of the Applegate was 44,000 cfs on January 2, 1997 (USGS 1997). The Applegate River enters the Rogue River just upstream of the downstream most point in the Rogue - Recreation Watershed.

H. WATER QUALITY

Water quality varies greatly throughout the Rogue - Recreation Watershed. The Rogue River, Hog Creek, Galice Creek, South Fork of Galice Creek, Dutcher Creek, Pickett Creek, Shan Creek and Taylor have been identified as water quality-limited (303(d) listed) under various criteria and nonpoint water pollution has been identified as moderate to severe in these two streams. The types of water quality and pollution are detailed in Chapter III, Current Condition.

I. STREAM CHANNEL

The major streams in the Rogue - Recreation Watershed can be classified into three stream types, based on the Rosgen system of stream classification: A, B, C and F. Type A are steep entrenched, cascading, step/pool streams with high energy transport associated with depositional soils and are very stable if bedrock or boulder dominated. Type B are moderately entrenched, have a moderate gradient with a riffle dominated channel and with infrequently spaced pools. They have a very stable plan and profile with stable banks. Type C are moderately meandering with floodplains on one or both sides of the channel. Type F are entrenched, meandering and have a riffle/pool channel on low gradients with high width/depth ratios.

J. VEGETATION

The Rogue - Recreation Watershed is dominated by mixed conifer and mixed conifer/hardwood forests. The existing vegetative conditions in the watershed developed as a result of geologic conditions, climatic conditions, periodic disturbance, human influence and is characterized by high fire frequencies both historically and, to a lesser extent, in the present. Fire exclusion has resulted in significant increases in stand densities (more stems per acre), shifts in species composition (*e.g.*, increases in fire intolerant, shade tolerant species) and changes in stand structure. These transformations have made the forests more susceptible to large, high severity fires and to epidemic attack by insects and disease.

Effects on the plant communities in the Rogue - Recreation Watershed has been the result of more direct human influences. Mining, logging, agriculture, road building and residential development have reduced the amount of late-successional forest within the watershed while increasing the amount of early seral stages.

The Rogue - Recreation Watershed contains at least six plant series: white oak, ponderosa pine, Douglas-fir, Jeffrey pine, white fir and Tanoak. (Plant communities (associations) with the same climax dominant(s) are referred to as plant series. The Jeffrey pine series, for example, consists of associations in which Jeffrey pine is the climax dominant (Atzet and Wheeler 1984).)

Some of the riparian areas (*e.g.*, Galice Creek and Mill Creek) of this watershed contain Port-Orford cedar.

K. SPECIES AND HABITATS

1. Terrestrial

a. Special Status Plants

Only approximately 20% of BLM lands surveyed for special status in the Rogue - Recreation Watershed have been surveyed for special status plants to date (January 1999). Lands surveyed have been in conjunction with the following timber projects: Stratton Hog, Cenoak, Maple Syrup, Picket Snake and Peavine Thin. For such a small portion of the watershed surveyed, the amount of species found has been high. This is due to the high diversity of habitats found in the watershed. Besides plant associations dominated by Douglas-fir, there can also be found good representation of oak woodlands, serpentine, true fir, and tanoak dominated stands.

Thirty-eight populations of Survey and Manage vascular plants have been found. The majority were *Allotropa virgata* populations, but *Cypripedium fasciculatum* and *C. montanum* were also found. Several Bureau-Sensitive species have been located including *Sophora leachiana, Sedum moranii, Camassia howellii* and *Microseris howellii*. These species were Category 2 candidates (now called Species of Concern) under the Federal Endangered Species Act and are also candidate species under the Oregon Endangered Species Act (List 1 under the Oregon Natural Heritage Program). Due to changes with protection categories under the Federal Endangered Species Act, the plant is now also considered as Bureau Sensitive by BLM. Several Bureau-Assessment Species have been found: *Lotus stipularis var. stipularis*, *Arabis modesta, Fritillaria glauca, Carex serratodens* and *Eschscholzia caespitosa*. These species are also designated List 2 under the Oregon Natural Heritage Program.

b. Wildlife

The threatened northern spotted owl (*Strix occidentalis caurina*) and the American Bald Eagle are the only known ESA listed species in the Rogue - Recreation Watershed. A portion of the watershed has been designated as Critical Habitat for the northern spotted owl by the U.S. Fish and Wild Service (USFWS). In addition, there are eight established 100-acre core areas in the watershed. These areas are managed late-successional reserves (NFP, RMP).

Key processes for wildlife include dispersal and migration of wildlife within and through the watershed. This process is highly dependent on quality, quantity and spatial distribution of appropriate habitat through time. Species habitat requirements vary greatly and a single dominate vegetative structure will not meet

the needs of all species. Migration can occur at a localized level or at regional level. Species migrating through the watershed on a regional level include animals as diverse as insects, bats and birds. Localized migration allows for species to take advantage of foraging opportunities and cover during inclement conditions. Localized dispersal of species is critical for insuring gene flow and repopulation of uncolonized habitat.

The high diversity of soil types and consequent vegetative communities and habitats in the Rogue - Recreation Watershed provides for the potential of a host of sensitive animal species. There is potential habitat for 46 vertebrate special status species (15 mammals, 19 birds and 12 reptiles and amphibians). In addition, a host of Survey and Manage invertebrates species may occur in the vicinity (see Chapter III, Current Condition for complete list of sensitive species). Relatively few formal surveys for wildlife have actually been conducted in the watershed. Distribution, abundance, and presence for the majority of the species is unknown. Other species of concern include cavity nesting species, band-tailed pigeons, and neotropical migrant birds. Twenty-one special status species are associated with older forest, eight with riparian, and eight with special habitats such as caves, cliffs and talus. The remaining species are associated with habitats such as oak stands, meadows and pine savannahs (see Chapter V, Synthesis and Interpretation for habitat trends). The NFP has identified additional "Survey and Manage" wildlife species that probably occur in the watershed (see Chapter III, Current Condition).

2. Aquatic

Factors such as stream temperature, number and depths of pools, large woody material, stream meander, road/stream crossings and sedimentation are key to the survival of salmonids and can severely limit fish production. Rearing salmonids require a water temperature of 58°F for optimum survival condition. Stream temperature is dependent upon riparian area temperature and both are influenced by heat sinks such as nearby roads and open meadows. Most fluvial streams in the Rogue River Basin are deficient in the numbers of pools. Pools provide depth for hiding cover and volume for rearing habitat. A goal for adequate pool to riffle ratio is 40:60 or 30:70 depending on the geomorpholgy of the watershed.

Cutthroat trout, steelhead, coho and chinook salmon are found in the Rogue - Recreation Watershed. Each are a cold water species and require complex habitats, especially in the early life stages. Quantitative abundance estimates are absent. A qualitative analysis depicts a low abundance of coho and low to moderate abundance for cutthroat trout, steelhead and chinook based on professional observations. Coho salmon can be considered an indicator species for the health of an aquatic ecosystem. Cutthroat and steelhead typically have a wider range of distribution and are found higher in the tributaries than coho and chinook. Factors limiting salmonid production include: 1) Inadequate stream flows in the summer months, 2) high water temperatures, 3) erosion/sedimentation to streams, 4) low levels of large woody material in the stream and riparian area, 5) lack of rearing and holding pools for juveniles and adults, respectively, 6) channelization of streams in the canyons and lowlands, and 7) blockages of migration corridors.

The mainstem of the Rogue River flows through the Rogue - Recreation Watershed. Anadromous fish such as the Pacific lamprey, salmonids including summer and winter steelhead, cutthroat trout, fall and

spring chinook and coho salmon use the Rogue River for migration. Fall chinook spawn in the mainstem primarily below Gold Ray Dam. As summer water temperatures rise, disease rates in salmonids increase. Spring chinook, which remain in the wild section all summer, are particularly affected by disease.

L. FIRE

1. Background

Fire regimes of the Pacific Northwest are a function of the vegetation growth environment (temperature and moisture patterns), ignition pattern (lightning, human) and plant species characteristics (fuel accumulation, adaptations to fire, etc.). Effects of forest fires can be more precisely described by grouping effects by fire regimes. Agee (1981) describes three broad fire regime categories (these can and often do overlap considerably with one another):

High-severity regimes: Fires are very infrequent (more than 100 years between fires); they are usually high-intensity, stand replacement fires.

Moderate-severity regime: Fires are infrequent (25-100 years); they are partial stand replacement fires, including significant areas of high and low severity.

Low-severity regime: Fires are frequent (1-25 years); they are low-intensity fires with few overstory effects.

Fire regimes are the manifestation of the biological, physical, climatic and anthropomorphic components of an ecosystem as reflected in the type, frequency and size of fires (Pyne 1982). This is a relationship that perpetuates itself in a circular and stable pattern. The biotic components are an expression of the fire regime, and in turn maintain the pattern and occurrence of fire. However, when any components of the ecosystem are modified, the fire regime is prone to change.

The persistence of certain species in southwestern Oregon through the millennia can be attributed to their adaptations to fire (Kauffman 1990). Adaptations for fire survival are adaptations to a particular ecosystem and its specific fire regime. If the regime is altered, the capacity for that species to survive in the environment may be greatly changed.

2. Fire Disturbance

The Rogue - Recreation Watershed has historically experienced a low-severity fire regime. Low-severity fire regimes are associated with frequent fires of low intensity. In a low-severity fire regime most of the dominant trees are adapted to resist low-intensity fire. They develop thick bark at a young age. This limits overstory mortality and most of the fire effects occur on small trees in the understory. Fires in a low-severity regime are associated with ecosystem stability, as the system is more stable in the presence of fire then in its absence (Agee 1990). Frequent, low-severity fires keep sites open so that they are less likely to burn intensely even under severe fire weather.

With the advent of fire exclusion/suppression, the pattern of frequent low-intensity fire ended. Dead and down fuel and understory vegetation are no longer periodically removed. This creates a trend toward ever increasing amounts of available fuels present. The longer interval between fire occurrence creates higher intensity, stand replacement fires rather than the historical low-intensity stand maintenance fires.

It is important to recognize that each vegetation type is adapted to its particular fire regime and not to any fire regime (Agee 1981). The significance of this is that the historical vegetation types that existed prior to Euro-American settlement cannot be maintained in the present fire regime that has resulted from fire exclusion.

3. Fire Risk

Human actions greatly influence the pattern of fire occurrence and number of fires in the watershed. The watershed as a whole has a high level of risk of human caused ignition. Human uses which create ignition risk include residential, industrial (light manufacturing, timber harvest, mining/quarry operations), recreational, tourist and travel activities. Human use within the Rogue - Recreation Watershed is high. The human caused fire occurrence pattern for the watershed would generally be a fire starting at low elevations or along roads and burning up to the uppermost ridgetops.

Lightning occurrence in the watershed has been high. The watershed typically experiences at least one lightning storm event each summer. Multiple fire starts often result from these storms.

The potential for a large fire is high to extremely-high for this watershed. This is due to the build up of fuels, both live and dead, overstocking of conifers and hardwoods, and the presence of less fire resistant species which have invaded in the absence of frequent fire occurrence and past management practices that created but did not treat slash.

M. HUMAN USES

The land ownership pattern of the Rogue - Recreation Watershed was molded in the late 1800's and early 1900's. The lands in the watershed in the mid-1800's were public lands owned by the United States and administered by the General Land Office. The first large scale transfer of public lands from federal ownership was to the State of Oregon following statehood in 1859.

In order to further develop the West, Congress passed several laws enabling settlers to develop and obtain ownership of the public lands. These included Donation Land Claim patents, entry under the Homestead Acts, military patents and mineral patents. In addition to these types of deeds, land was deeded to the Oregon and California Railroad (O&C), with some of those lands being sold to private individuals. In reviewing the master title plats for the Rogue - Recreation Watershed, it is apparent that ownership of several of the low elevation lands were originally deeded from the United States to private individuals through the above Acts of Congress.

Current human use of the watershed includes river recreation, timber production and harvesting, mining,

and dispersed recreation. Recreational use of the area is dispersed and includes off-highway vehicle (OHV) use, hunting, mountain biking, and equestrian use. There are currently many non-designated trails and footpaths in the area. A portion of the Quartz Creek off-highway vehicle area is located in the northwestern corner of the watershed.

The Rogue National Wild and Scenic River travels through the watershed. This section of river is designated recreational and receives a high amount of use during the summer. Designated in 1968 as one of the first eight rivers included within the Wild and Scenic Rivers Act, the Rogue was recognized for its outstanding recreation values, fisheries and scenery. The river's free flowing condition was ensured with this designation. Power companies had for years recognized the hydropower potential of this fast flowing stream and had future plans for up to three powersite withdrawals within the 84-mile designated stretch.

The predominant use of the river at present is for waterbased recreational activities. The river is used all year, however most use occurs between May and November. A substantial commercial recreation provider industry exists which produces many local jobs. Approximately one milllion people yearly visit this area for the express reason of visiting the Rogue.

II. KEY ISSUES

A. INTRODUCTION

The purpose of this section is to focus the analysis on the key elements of the ecosystem that are most relevant to the management questions, human values, or resource conditions within the watershed *(Federal Guide for Watershed Analysis,* Version 2.2, 1995).

Key issues are identified in order to focus the analysis on the unique elements of the watershed. Key issues are addressed throughout the watershed analysis process within the context of the related core questions. *(Federal Guide for Watershed Analysis*, p. 12-14). Key issues identified are summarized in Table II-1. A short narrative follows which discusses the relevance of each key issue in the watershed. Issues are not listed in any order of relative importance.

Table II-1: Key Issues

Key Issues	Related Core Topic
A. Rogue Wild and Scenic River Corridor	Fire, Human Uses
B. Fuel/Fire -The watershed encompasses rural interface areas and heavy recreational use which creates a potential high risk of fire occurrence. There is a high potential for large scale high intensity stand replacement fire due to vegetation density and fuels build up.	Fire, Vegetation, Erosion Processes, Water Quality, Species and Habitat
C. Mining and Mining Claim Occupancy - There are several claims existing within the watershed. There are also several occupancies on mining claims. Mining and occupancy may cause stream turbidity and contamination due to runoff of unreclaimed areas, and the placement, or lack thereof, and use of non-functional and sometimes unapproved septic waste systems.	Human Use, Hydrology, Erosion Processes, Water Quality
D. Road Distribution - road distribution is reflected in a broad range of road densities in subwatersheds. There continues to be pressure to build roads for access (*e.g.*, reciprocal rights).	Uses, Hydrology, Erosion Processes, Human Species and Habitats
E. There is an unusually high amount of "Water Quality Limited" streams, usually due to high summer temperature.	Water Quality, Human Uses, Hydrology, Stream Channel, Erosion Processes, Species and Habitats
F. Noxious Weeds.	Vegetation, Species and Habitats
G. Dispersed recreational use.	Human Uses, Erosion Processes, Species and Habitat, Hydrology
H. Elk Management Area.	Species and Habitats
I. Late-Successional Reserve/Critical Habitat.	Species and Habitats

B. ROGUE WILD AND SCENIC RIVER CORRIDOR

The high levels of recreational use of the Rogue naturally creates what are called user conflicts (when different uses compete for the available space on the river). Predominantly, the major user conflict is between motorized and non-motorized river craft. Commercial jet boat tours run yearly from May through September. This time period also corresponds to the peak use of non-powered float craft. Active management of motorized used to mitigate this conflict is an important part of currently river management.

All private land within the congressionally designated boundary is encumbered with scenic easements purchased by the BLM within the Wild and Scenic Rivers Act of 1968. The associated property owners are thus very sensitive to the impacts of recreation use on the river. Noise, trespass by river users on private property, erosion of shoreline lands due to boat wakes or other use are of concern.

C. FUELS AND FIRE

There is a high level of risk for a large scale, high-severity wildfire within the watershed. Mixed land ownership, rural interface area and heavy recreational use increases the complexities of fire prevention, protection, fuels management and hazard reduction programs.

Fire exclusion has created vegetation and fuel conditions with high potential for large, destructive, and difficult to suppress wildfire occurrence. The watershed has a large amount of high values at risk of destruction and loss from wildfire. High severity, stand replacement wildfire presents a threat to human life, property, and nearly all resource values within the watershed. Management activities can reduce the potential for stand replacement type fires through hazard reduction treatments. Public acceptance of hazard reduction management activities will be critical for the long-term health and stability of the forest ecosystem within the watershed.

D. MINING AND MINING CLAIM OCCUPANCY

There has been a large amount of mining activity in the past within the watershed. Of note is the area along Galice Creek and within the Rogue River. There are still several claims existing within the watershed, with some mining activity occurring. The majority of the mining occurring at this time is small scale such as dredging and panning.

There are several mining claim occupancies within the watershed. The largest concentration is along Galice Creek. Issues related to mining and occupancy include, but are not limited to, potential turbidity in streams from mining, the lack of adequate and approved septic waste systems, and the occurrence of occupancy unrelated to mining. In addition there are several mineral patents pending within the watershed.

E. ROAD DISTRIBUTION

The distribution of roads is variable. There are high road densities in some subwatersheds (HUC 7's) such

as Hog Creek, Picket Creek and parts of Galice Creek. This can relate to soil erosion, water quality and quantity issues. Improperly designed roads concentrate surface and shallow groundwater and routes it to natural drainageways changing their classification and increasing soil movement. High road densities can also have numerous adverse impacts on fish and wildlife. Unmanaged roads may lead to increased vehicular/human disturbances, serve as access for poaching and fragmented areas of habitat.

F. WATER QUALITY LIMITED STREAMS

There are a number of "Water Quality Limited" streams in the watershed. This is usually due to high summer water temperatures. ("Water Quality Limited" refers to streams that do not meet water quality standards set by the Environmental Protection Agency (EPA)/Oregon Department of Environmental Quality.) This is due to nonpoint sources, that is, the sources for degraded water quality are dispersed rather than concentrated in particular site or point source. The Rogue River, Hog Creek, Galice Creek, South Fork of Galice Creek, Dutcher Creek, Pickett Creek, Shan Creek and Taylor Creek have been identified as water quality-limited under various criteria and nonpoint water pollution. The predominant limitation for these streams is warm temperatures during the summer months.

G. NOXIOUS WEEDS

The Rogue - Recreation Watershed is divided by the Rogue River. One major problem occurring along the Rogue is the invasion of purple loosestrife (*Lythrum salicaria)* along its banks. This is one of the most noxious weeds to invade Oregon's waterways. The plant spreads by both rhizomes and seeds. Currently, there is potential to eradicate populations within the watershed, but the problem of upstream populations could create a larger challenge. Along the road systems, particularly in the Pickett Creek drainage, scotch broom (*Cytisus scoparius*) is increasing rapidly on exposed soils.

H. DISPERSED RECREATIONAL USE

Dispersed recreational use in the watershed includes hiking, hunting, driving for pleasure, four-wheel driving, mountain biking and horseback riding. These uses occur mainly along existing roads and trails in the watershed. There are no officially designated trails in the watershed. However, there are many informal trails throughout the watershed, especially in the Quartz Creek off-highway vehicle (OHV) area. This area is an RMP designated site of 7,120 acres in the Quartz, Hog and Stratton Creek drainages. Approximately 2,500 acres of the OHV area are in the Rogue - Recreation Watershed.

Potential recreation sites include: Trowbridge Ponds, Peavine Lookout tower, Silver Creek ACEC, Stratton Creek trail system, Buckhorn Mountain/Zigzag Creek trail system, Hedinger Grove Old-Growth trail system, Galice-Hellgate Back Country Byway driving tour, Quartz Creek OHV area, and other mining ditches that could potentially be trail systems.

I. ELK MANAGEMENT AREA

The Northwest portion of the Rogue - Recreation Watershed is an Elk Management Area. The management purpose of this designation is to enhance elk habitat consistent with the objectives of the Late-Successional Reserve. Issues include limiting motorized vehicle use to an open road density of 1.5 miles, seasonal restriction of activities to avoid disturbance, maintenance and enhancement of forage (RMP, p. 48).

J. LATE-SUCCESSIONAL RESERVE/CRITICAL HABITAT

A portion of the Rogue - Recreation Watershed is designated as Late-Successional Reserve (see Map 3) and or Critical Habitat. Critical Habitat for the northern spotted owl was designated in 1992 by the USFWS in order to facilitate the recovery of the species. The service designated areas that would protect clusters of reproductively-capable spotted owls. Like Critical Habitat, the Late-Successional Reserve System was developed around clusters of owls, while taking into consideration the needs of other late-successional forest species. In general, critical habitat and late-successional reserve overlap in the Rogue - Recreation Watershed with the exception being that critical habitat extends to the eastside of the Rogue River. The USFWS accepted the late-successional reserve system as the federal agencies' contribution to the recovery of the northern spotted owl.

III. CURRENT CONDITION

A. PURPOSE

The purpose of the Current Condition section is to develop detailed information relevant to the key issues from Step 2, and to document the current range, distribution, and condition of the core topics and other relevant ecosystem elements.

B. CLIMATE

The Rogue - Recreation Watershed has a Mediterranean climate with cool, wet winters and warm dry summers. Most of the precipitation is in the form of rain with less than 10% of the watershed located above 3,000 feet in elevation in the transient snow zone (TSZ). The TSZ is where shallow snow packs accumulate and then melt throughout the winter in response to alternating cold and warm fronts (USDI-BLM 1993). Average annual precipitation in the Rogue - Recreation Watershed ranges from approximately 33 inches to104 inches. The least amount of rain falls in the southeast portion of the watershed. The greatest amount of precipitation falls in the far west portion of the watershed at the highest elevations, approximately 4,000 feet. There is also the greatest increase of precipitation of 20 inches moving west in less than a mile. This shows a strong rain shadow effect from coastal storms.

The National Oceanographic Atmospheric Administration (NOAA) Weather Station is located about seven miles to the east of the Rogue - Recreation northeast boundary on Sexton Summit within the Jumpoff Joe Watershed at an elevation of 3,836 feet. Temperatures recorded at Sexton Summit show the lowest average monthly minimum occurs in January at 30.5° F. The highest average monthly maximum temperature occurs in July at 75.1° F. This correlates to temperatures at high elevations within the Rogue - Recreation Watershed. Temperatures recorded at the Grants Pass NOAA Weather Station show the lowest monthly minimum average occurs in January with a temperature of 32.3° F. The highest average monthly maximum in Grants Pass occurs in July at 89.8° F. This correlates to temperatures at lower elevations within the Rogue - Recreation Watershed.

The 30-year average (1951-1980) rainfall at the Grants Pass Weather Station is 31.01 inches. The average monthly rainfall for this period is shown in Figure 1. The average monthly air temperatures at the Grants Pass Weather Station are shown in Figure 2. The 30-year average (1951 through 1980) rainfall at Sexton Mountain is 38.14 inches. The average monthly air temperatures at Sexton Summit Weather Station are shown in Figure 3.

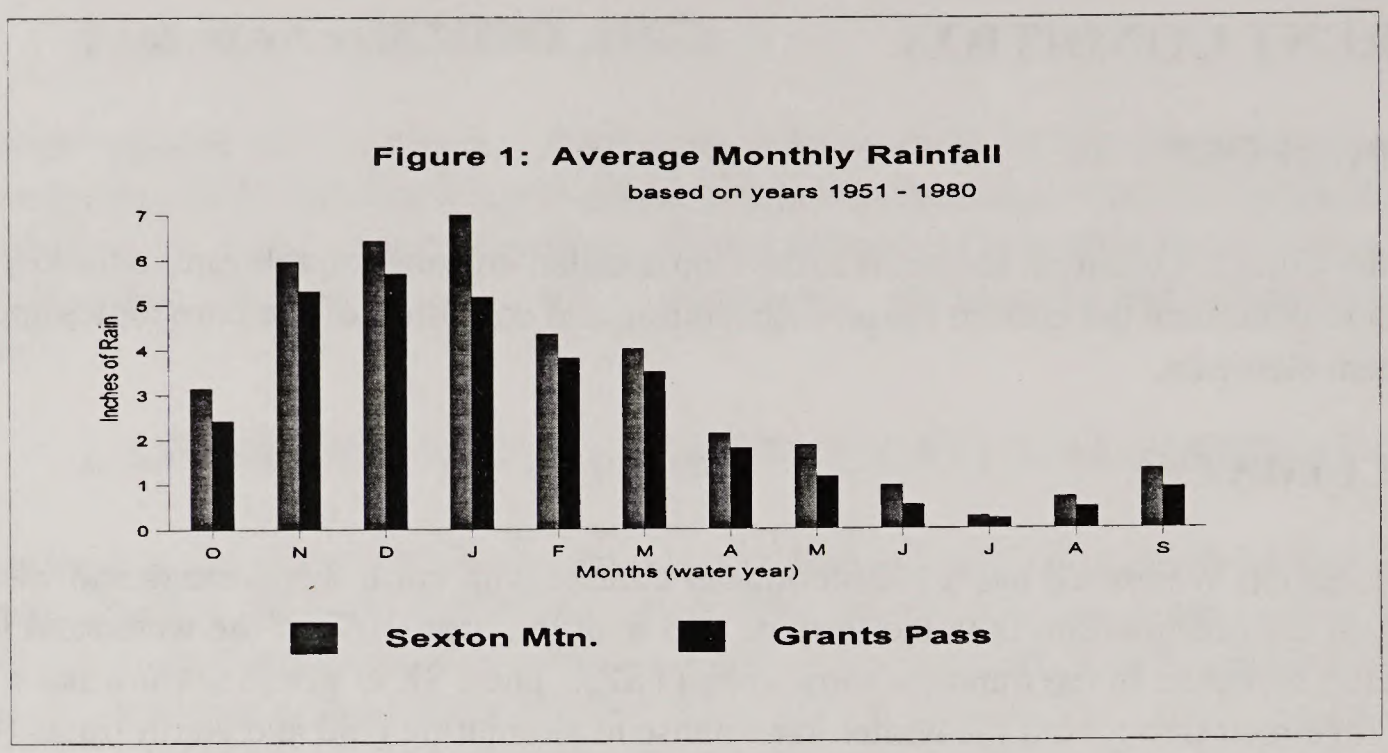


Figure 1: Average Monthly Rainfall
based on years 1951 - 1980
Inches of Rain
0
1
2
3
4
5
6
7
O N D J F M A M J J A S
Months (water year)
Sexton Mtn.
Grants Pass

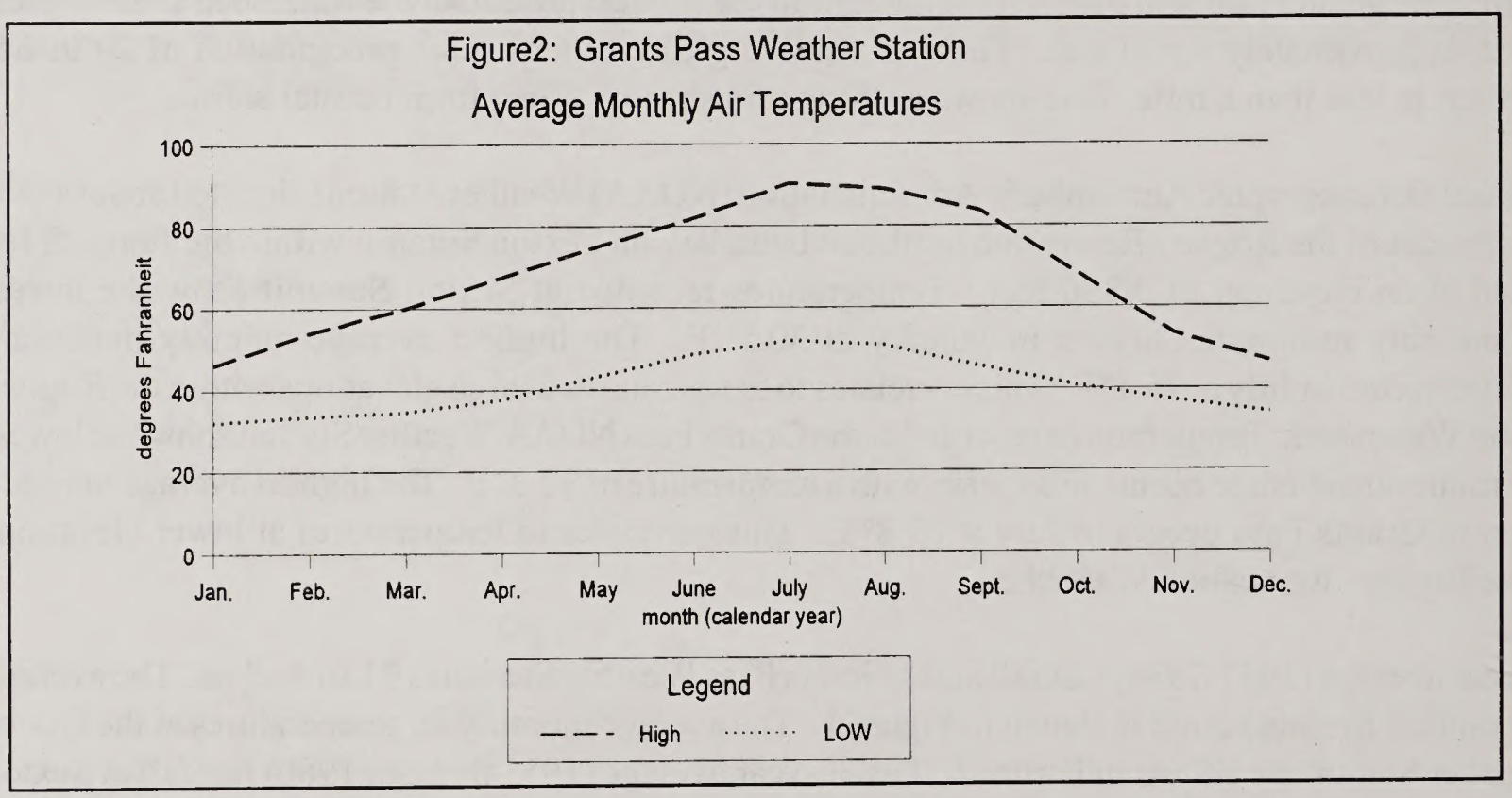
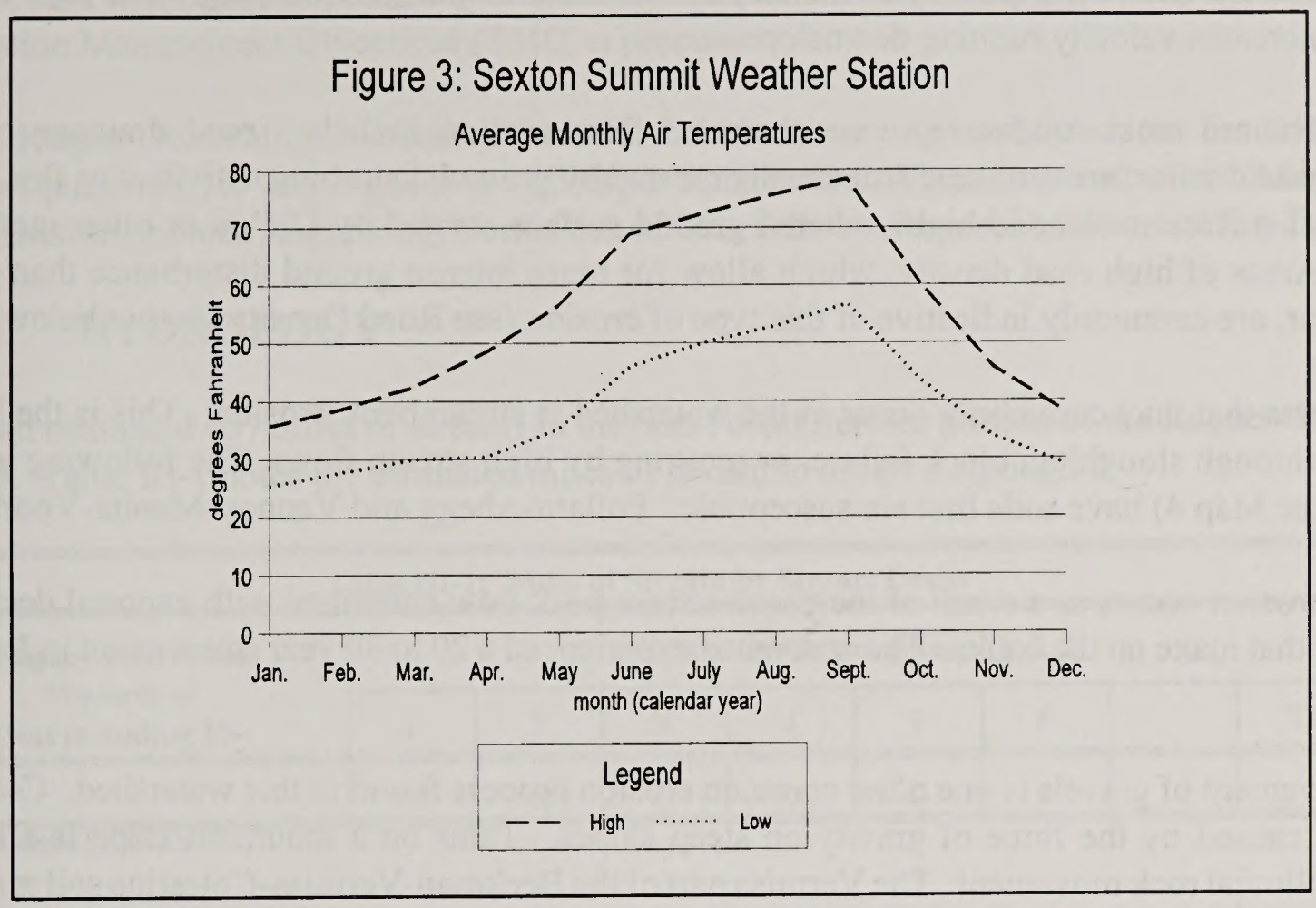


Figure2: Grants Pass Weather Station
Average Monthly Air Temperatures
degrees Fahranheit
0
20
40
60
80
100
Jan. Feb. Mar. Apr. May June July Aug. Sept. Oct. Nov. Dec.
month (calendar year)
Legend
High
LOW

Source: NOAA



Source: NOAA

C. SOILS

1. Erosion Processes

"Erosion hazard" is an indication of a soil's susceptibility to particle or mass movement from its original location. Particle erosion hazard, concentrated flow assumes a bare soil surface condition. If the soil is protected by vegetation, litter, and duff, such that no mineral soil is exposed, concentrated flow erosion is not likely to occur and mass movement or streambank erosion is less likely to occur.

The dominant erosion process is concentrated flow erosion: gully, rill and sheet. This form of erosion occurs when water accumulates on the soil surface predominately where there is little or no protective organic material. As the water flows downslope it builds energy which allows for detachment of soil particles that then travel as sediment in the flowing water. Sediment is then deposited where flow rates diminish.

Areas that are particularly susceptible to concentrated flow erosion consist of soils of variable parent materials on steep slopes. The following general soil groups (see Map 4) fall into this category: Vannoy-Manita-Voorhies, Josephine-Speaker-Pollard, Beekman-Vermisa-Colestine, Siskiyou, Pearsoll-Dubakella and Cornutt-Dubakella.

These soils have surface textures ranging from gravelly sandy loam to cobbly clay loam. These soils have

high erosion hazard due to the severity of the slope. The steep slopes give flowing water high erosive energy as it increases velocity running downslope.

Conditions that are most conducive to concentrated flow erosion include; road drainage outlets, unprotected road ditches, areas of bare soil usually created by ground disturbing activities or fire, wheel ruts on natural surface roads, and highly-altered ground surface created by OHV's or other motorized equipment. Areas of high road density, which allow for more intense ground disturbance than would naturally occur, are commonly indicative of this type of erosion (see Road Density section below).

Another process that may commonly occur in the watershed is streambank erosion. This is the loss of streambanks through sloughing, block failure, or scouring by high stream flows. The following general soil groups (see Map 4) have soils that are susceptible: Pollard-Abegg and Vannoy-Manita-Voorhies.

Streambank erosion occurs as a result of increased stream peak flow combined with exposed deep, fine textured soils that make up the banks. The watershed experienced a 20 to 30 year storm event in January, 1997.

Colluvial movement of gravels is one other common erosion process found in this watershed. Colluvial movement is caused by the force of gravity on steep slopes. Talus on a mountain slope is a simple example of colluvial rock movement. The Vermisa part of the Beekman-Vermisa-Colestine soil map unit commonly has patches of varying size of gravel, "lag slopes." The gravel is commonly 2 - 6+ inches thick. Areas that commonly accumulate gravel include draw and swale bottoms, other depression of steep sloping landscape.

2. Variable Road Densities

Roads on sloping ground intercept surface water and shallow groundwater. The water is commonly routed by the road to a draw or other drainageway that is part of the natural stream system. This process causes drainage water to reach streams quicker than would naturally occur. The more roads that exist in a particular area, the more the increase of peak stream flow is. With an increase of peak stream flow, streambanks are more susceptible to erode as the stream channel adjusts to the change in flow pattern. Additional stream sediment caused by this phenomenon predominately comes from eroded streambanks. Other sources for stream sediment are the road surface, slough from steep road banks, and eroded channels created by flows at drainage outlets downslope.

The above gives the general perspective on high road densities, however, road design and locations of the landscape produce varying effects. For example, an outsloped road with water dips, rocked surface and outlet filters would produce less effects than a lower slope natural surfaced road with ditches. This is because of differences in proximity to the stream system, degree of concentration/distribution of surface water flow due to road design, and differences in amount of protection of the road surface. In order to understand the comprehensive nature of road effects in the Rogue - Recreation Watershed a full analysis of all subwatersheds is needed of road densities and existing road conditions, design and location on the

landscape. This will be accomplished by evaluating each road in the transportation system through the Transportation Management Objectives (TMO's) process.

Within the Rogue - Recreation Watershed there are extremely varying road densities. From low (about 2 miles per square mile) to very high (over 6 miles per square mile). The subwatersheds with high to very high road densities include Rogue Hog, North Fork of Galice, Picket Rogue, Dutcher, and Zig-Zag Rogue.

D. HYDROLOGY

There are an estimated 457 miles of streams in the non-Forest Service portion of the Rogue - Recreation Watershed. Table III-1 notes the estimated miles of stream in orders 3 through 6.

Table III-1: Miles of Stream by Stream Order

Rogue - Recreation Watershed (Not including FS)	Stream Orders (except 1 & 2)							
	1	2	3	4	5	6		Total
	nd	nd	77	35	21	4		137

Source: Medford BLM GIS

Stream orders are defined by how many streams come together to create a larger stream. A stream that is at the headwaters and has no tributaries is a first order stream. When two first order streams flow together at the point that they join, the stream becomes a second order stream, etc.

First and second order streams in the watershed have a major influence on downstream water quality since they comprise approximately 70% of the total stream miles in the planning area. Beneficial uses supported by these streams include aquatic species and wildlife. Most first and second order streams in the watershed are characterized by intermittent stream flow, which are generally very narrow and V-shaped with steep gradients. Large woody debris, which dissipates stream energy and slows channel erosion, is a key component of these headwater streams. The amount of large woody debris in first and second order streams in the planning area has been greatly reduced as a result of harvest and prescribed burning. This loss of woody debris contributes to reduced channel stability and increased sediment movement downstream during storm events (USDI-BLM 1994).

Third and fourth order streams comprise 25% of the stream miles in the watershed. Many of these streams support fish or directly contribute to the water quality of fish-bearing streams. Third and fourth order streams in the watershed are generally perennial, fairly narrow, have stream gradients less than 5%, and have U-shaped channels. During winter storms, these streams can move large amounts of sediment, nutrients, and woody material. Channel condition of these streams varies and depends upon the inherent channel stability and past management practices in the watershed. The amount of large woody debris contributed to these streams has been reduced by past management practices in the riparian areas (USDI-BLM 1994).

Fifth order and larger streams make up 5% of the stream miles in the planning area. These streams support fish as well as other beneficial uses. Fifth order and larger streams tend to be wider, have flatter gradients, and a noticeable floodplain. Flood events play a major role in the channel condition of these larger streams. Actions on adjacent upland areas and on non-BLM-administered land have adversely affected some of these stream segments (USDI-BLM 1994).

Mature forest stands along all streams on BLM-administered land generally contain trees of sufficient size to provide a future source of large woody debris. However, past practices such as salvage logging from stream channels, leaving inadequate numbers of conifers in riparian areas, and removing debris jams to improve fish passage have reduced the amount of large woody debris in fifth order and larger streams (USDI-BLM 1994).

E. WATER QUALITY

Water quality varies greatly throughout the Rogue - Recreation Watershed. The Oregon Department of Water Quality has monitored and/or collected water quality data from various sources on the streams and water bodies of the state. This information is captured in DEQ's 1988 Oregon Statewide Assessment of Nonpoint Sources of Water Pollution, and has been periodically updated and compared to standards. This has led to listing of some streams as "Water Quality Limited." The most recent stage of this process has been the publication for public review of Oregon's 1998 Section 303(d) Decision Matrix by the Oregon DEQ. The Medford BLM has performed limited amounts of water quality testing (temperature) in the Rogue - Recreation Watershed.

Table III-2 was created from data from the DEQ's 1998 303(d) Draft List Decision Matrix.

Table III-2: Oregon DEQ's 303(d) Listed Streams

Stream & Segment	Parameter/ Criteria	Basis for Consideration	Supporting Data or Info	Listing Status
Rogue River: Grave Creek to Applegate	Bacteria-Summer Water Contact Recreation	DEQ Data(1994)	DEQ Data (1986-1995)	303(d)
	Flow Modification	NPS Assessment Data (DEQ 1988)	None	Need Data
	Nutrients	NP Assessment Data (DEQ 1988)	None	Need Data
	pH (F.,W,Sp.)	DEQ Data	DEQ Data (1986-1995) 6 values failed, maximum value 9.0	303(d)
	Sedimentation	NPS Assessment Data (DEQ 1988)	None	Need Data
	Temperature (Fish Rearing, 64°F)	USFS Data; NPS Assessment Data (DEQ 1988)	DEQ Data exceeded standard 14 days, 1986 - 1995	303(d)
Dutcher Creek	Temp. (Fish Rearing, 64°F)	ODFW Data	ODFW Data exceeded standard 1994	303(d)
Galice Creek, Mouth to North/South Fork Confluence	Sedimentation	NPS Assessment Observation (DEQ 1988)	None	Need Data
	Temperature (Fish Rearing, 64°F)	ODFW, BLM Data	BLM Data exceeded standard in 1994	303(d)
North Fork Galice Creek	Sedimentation	NPS Assessment Observation (DEQ 1988)	None	Need Data
S. Fork Galice Creek (Mouth to Chiefton Creek)	Temperature (Fish Rearing, 64F)	USFS Data; ODFW Data	Exceeded standard in 1994	303(d)
Hog Creek	Temperature (Fish Rearing, 64°F)	BLM Data	Exceeded standard in 1995	303(d)
Picket Creek	Temperature (Fish Rearing, 64°F)	ODFW Data	Exceeded standard in 1993,1994	303(d)
	Habitat Modification	NPS Assessment, Observation (DEQ 1988)	None	Need Data
Shan Creek	Temperature (Fish Rearing, 64°F)	ODFW and USFS Data	Exceeded standard in 1991, 1994	303(d)
Taylor Creek	Temperature (Fish Rearing, 64°F)	USFS Data	Exceeded standard in 1990 to 1995	303(d)

All streams above with 303(d) status are Water Quality Limited. They will be required to be managed under Water Quality Management Plans. Other streams with status of "Need Data" are candidates for Water Quality Limited status but due to insufficient data, that conclusion was not possible when the list was made. Future data collection may change status. There are other streams that have simply been missed in the inventory process. One known example is Stratton Creek. Stratton Creek was not inventoried and no data was collected. It is a Class 1 and 2 stream. Observation by BLM specialists indicates that it should be a candidate for 303(d) listing due to warm summer temperatures, sedimentation and habitat modification.

1. Water Temperature

Many factors contribute to elevated stream temperatures in the Rogue - Recreation Watershed. Low summer stream flows, hot summer air temperatures, low gradient valley bottoms, lack of riparian vegetation, and high channel width-to-depth ratios result in stream temperatures that can stress aquatic life. Natural disturbances that can affect stream temperature are climate (high air temperatures), below normal precipitation (low flows), wildfire (loss of riparian vegetation), and floods (loss of riparian vegetation). Human disturbances affecting stream temperatures include water withdrawals, channel alterations and removal of riparian vegetation through logging, mining, grazing or residential clearing (USDI-BLM 1997). Logging and mining are the two forms of human disturbances that are most evident in this watershed. Some stream temperatures in natural (undisturbed) condition may be higher than the daily maximum due lack of vegetation for shade particularly in rocky, serpentine areas, and the very warm summer temperatures in this watershed.

The DEQ has established that the seven (7) day moving average of the daily maximum shall not exceed the following values unless specifically allowed under a department-approved basin surface water temperature management plan:

- 64°F
- 55°F during times and in waters that support salmon spawning, egg incubation and fry emergence from the egg and from the gravels.

The BLM and other agencies monitored stream temperatures in the watershed during the listed summers.

2. Stream Flow

The streamflow in the Rogue - Recreation Watershed fluctuates with the seasonal variation in precipitation for tributary streams. The Rogue River also fluctuates with upstream variation caused by releases at Lost Creek Dam, Applegate Dam and input from tributaries between the Rogue - Recreation Watershed and Lost Creek Dam.

a. Peak Flow

Maximum peak flows generally occur in December, January and February. No data is available for the

watershed.

Upland disturbances can result in increased magnitude and frequency of peak flows which may result in accelerated streambank erosion, scouring and deposition of stream beds, and increased sediment transport. The natural disturbance having the greatest potential to increase the size and frequency of peak flows is a severe, extensive wildfire. In the Rogue - Recreation Watershed the primary human disturbances that can potentially affect the timing and magnitude of peak flows include roads, soil compaction (due to logging and agriculture), and vegetation removal (forest product harvest and conversion of sites to agricultural use). Quantification of these affects on stream flow in the watershed is unknown. Roads quickly intercept and route subsurface water and surface water to streams. The road altered hydrologic network may increase the magnitude of increased flows and alter the timing when runoff enters a stream (causing increased peak flows and reduced low flows). This effect is more pronounced in areas with high road densities and where roads are in close proximity to streams (USDI-BLM 1997). Road densities per mile are listed for selected drainage areas in Table III-3.

Soil compaction resulting from yarding corridors, agriculture and grazing also affects the hydrologic efficiency within a watershed by reducing the infiltration rate and causing more rainfall to quickly become surface runoff instead of moving slowly through the soil to stream channels (USDI-BLM 1997). Compacted acres for selected drainage areas are listed in Table III-3.

Vegetation removal reduces water interception and transpiration and allows more precipitation to reach the soil surface and drain into streams or become groundwater. Until the crown closures reach previous levels, it is considered to be "hydrologically unrecovered." Rates of hydrologic recovery are site specific and depend on many factors including the type and extent of disturbance, soils, climate and rates of revegetation (USDI-BLM 1993). Large amounts of vegetation removal in the transient snow zone are of particular concern due to alterations of the stream flow regime and resultant increased peak flow magnitudes (USDI-BLM 1997). Equivalent Clearcut Acres (ECA) (unrecovered vegetation) and snow zone openings are shown in the following table. ECAs describe the acres within a particular subdrainage that do or will (in the foreseeable future and within the recovery period) exist in a clearcut condition. The ECA is determined by adding the area actually in clearcut condition with an "equivalent" clearcut area for roads outside of clearcut units and partial or selective cut units. The drainage areas listed in the table constitute 37% of the Rogue - Recreation Watershed.

The transient snow zone (TSZ) is the zone in which rain on snow will commonly fall. This is a moderate elevation that is between the common snow level and where rain is the usual form of precipitation. Table III-3 indicates that runoff from rain on snow in openings is not significant enough to create excessive runoff and thus high stream flows. This is because the area of openings does not appear to be large in relation to the subwatershed area.

Table III-3: Current Hydrologic Conditions of Selected Drainage Areas of Rogue - Recreation Watershed (BLM and Non-BLM Lands)

Drainage Area	Total Acres	Acres in TSZ		Open Acres in TSZ		Equivalent Clearcut Acres		Compacted Acres		Average Road Density (miles/sec)
	Acres	Acres	%	Acres	%	Acres	%	Acres	%	
Dutcher Creek	2,960	NA				NA		NA		5.0
Fly-Rogue ('94 est.)	2,600	0	0	0	0	222	8.6	179	6.9	3.4
North Fork Galice ('94 est.)	8,800	765	9	263	34	928	10.5	539	6.1	4.3
Rogue-Hog ('93 data)	3,196	0	0	0	0	490	15.3	324	10.2	11.0
Limpy Creek	4,928	NA				NA		NA		3.2
Picket Creek ('92 est)	9,000	0	0	0	0	967	10.7	396	4.4	7.7
Zig Zag ('94 est.)	2,600	0	0	0	0	52	2.0	234	9.0	4.9

TSZ = Transient Snow Zone; NA = Data not available

b. Low Flow

Low summer flows in the Rogue - Recreation Watershed reflect the low summer rainfall. Naturally low summer flows are exacerbated for tributaries to the Rogue River by periods of below normal rainfall. Low flow of the Rogue River is augmented through releases to the Upper Rogue from Lost Creek Lake and releases to the Applegate River from Applegate Lake. The greatest need for water occurs during the summer months when demand for irrigation and recreation uses is highest (Lindell 1997), though agricultural use in this watershed is minimal.

The lowest daily mean flow of the Rogue River at Grants Pass since filling of Lost Creek Lake was 744 cubic feet per second. The lowest flow since filling of Applegate Lake was 744 cubic feet per second (USGS 1997).

There is no known quantitative information about stream flows for the Rogue and its tributaries in the Rogue - Recreation Watershed.

3. Domestic Water

a. General

There is little information available about domestic water use in the watershed. Wells are the predominant source for drinking water in this rural watershed. There is no groundwater study for this area because use of groundwater is limited. Water quality and quantity is highly variable with arsenic and other natural

mineral contaminants (conversation with Jim Leffman) commonly occurring. Quantity varies also due to the nature of the bedrock and limited fracturing that would allow occurrence of aquifers.

The small unincorporated town of Galice uses surface water from Rocky Gulch. The system diverts the water from the stream in the northwest corner of section 36 through a pipe system to Galice. The watershed of Rocky Gulch is predominately on BLM land that is allocated as Late-Successional Reserve. Also, the BLM Rand recreation facility uses a year-round spring as a source for drinking water.

F. STREAM CHANNEL

A system of stream classification has been developed by Rosgen that is useful in interpreting various types of streams as to their sensitivity to disturbance and their recovery potential. The streams are classified by letter from A to G. The first letter determines the stream reach type, the number represents the channel material and the small case letter refers to the slope of the reach. Table III-4 provides a description of the stream classifications prevalent in the watershed.

Table III-4: Rosgen Stream Classification

Stream Type	General Description	Landform/Soils/Features
Aa+	Very steep, deeply entrenched, debris transport, torrent streams.	Very high relief. Erosional, bedrock or depositional features; debris flow potential. Deeply entrenched streams. Vertical steps with deep scour pools; waterfalls.
A	Steep entrenched, cascading, step/pool streams. High energy/debris transport associated with depositional soils. Very stable if bedrock or boulder dominated.	High relief. Erosional or depositional and bedrock forms. Entrenched and confined streams with cascading reaches. Frequently spaced, deep pools in associated step/pool bed morphology.
B	Moderately entrenched, moderate gradient, riffle dominated channel, with infrequently spaced pools. Very stable plan and profile. Stable banks.	Moderate relief, colluvial deposition, and/or structural. Moderate entrenchment and width/depth ratio. Narrow, gently sloping valleys. Rapids predominate w/scour pools.
C	Low gradient, meandering, point-bar, riffle/pool, alluvial channels with broad, well-defined floodplains.	Broad valleys w/terraces, in association with floodplains, alluvial soils. Slightly entrenched with well-defined meandering channels. Riffle/pool bed morphology.
F	Entrenched meandering riffle/pool channel on low gradients with high width/depth ratio.	Entrenched in highly-weathered material. Gentle gradients, with a high width/depth ratio. Meandering, laterally unstable with high bank erosion rates. Riffle/pool morphology.

Much of the Rogue River in the Rogue - Recreation Watershed is stream type C, though bedrock control commonly occurs that constricts the channel and the floodplain. Some other sections of the Rogue are stream type D. This is a braided condition with excessive bedloads. There is a high amount of surface water exposure to solar radiation. Depth is relatively shallow. These sections of Type D are not stable, usually occur due to excessive load of sediment created from an upstream source during high flows.

Table III-5: Rosgen Management Interpretations of Various Stream Types

Stream Type	Sensitivity to Disturbance	Recovery Potential	Sediment Supply	Streambank Erosion Potential	Vegetation Controlling Influence
A2	very low	excellent	very low	very low	negligible
A3	very high	very poor	very high	high	negligible
A4	extreme	very poor	very high	very high	negligible
B4	moderate	excellent	moderate	low	moderate
B5	moderate	excellent	moderate	moderate	moderate
B6	moderate	excellent	moderate	low	moderate
C3	moderate	good	moderate	moderate	very high
C4	very high	good	high	very high	very high
D4	very high	poor	very high	very high	moderate
F5	very high	poor	very high	very high	moderate

Twenty-four AA+ stream reaches were surveyed in the Peavine area within the LSR. There was a noticeable lack of large woody debris (LWD) in the stream channels. Pieces that were counted were as small as six inches in diameter. Six out of the 24 reaches were identified as low in LWD in streams contributes to the form and structure of a stream's channel. The woody debris may cause a stream to widen and become narrow, to deepen and become shallow, and stabilize and become unstable at different points along the channel bed and banks. This diversity of channel form results in diversity of habitat for aquatic organisms (see Aquatic section for further discussion and other streams observed). The large woody debris is particularly critical for the steep tributaries because it creates a stepped stream profile, with stream energy dissipated in relatively short, steep sections of the channel. Large woody debris also traps and slows the movement of sediment and organic matter through the stream system (USDI-BLM 1997). Seven of the surveyed reaches had a lack of large wood recruitment. This means that there will be long term lack of large wood in the identified reaches. Also, nine of the 24 reaches were identified as having upland watersheds that contribute to riparian degradation.

Substrate varies by the reach and stream throughout the watershed. The lower elevation, low gradient stream reaches predominantly contain gravel, sand or silt. Sources of fine sediment in the Rogue - Recreation Watershed appear to primarily come from road surfaces, fill slopes and ditchlines. Soil that moves into the ditchlines is carried to stream systems by ditch runoff. Drainage areas with high numbers of road stream crossings are likely to experience the most sediment movement into stream channels. The high energy types A and Aa+ streams are capable of transporting sediment to downstream reaches that support fish (USDI-BLM 1997).

Roads are adjacent to many of the stream reaches within the Rogue - Recreation Watershed such as Stratton Creek, Picket Creek and the North Fork of Galice Creek. In addition to being a sediment source,

these roads confine the stream channel and restrict the natural tendency of streams to move laterally. This can lead to down cutting of the stream bed or erosion of the streambank opposite the road (USDI-BLM 1997).

The trend for channel stability and condition should improve with additional large wood recruitment over the long term. Roads will continue to supply sediment, although maintenance and decommissioning would reduce the sediment source (USDI-BLM 1997).

Undersized culverts can affect the stream channel by restricting stream flow. Culvert installation prior to 1992 in the watershed was either designed for a 25 to 50 year flood event, or sized based on channel width and stream flow. Today's culverts are designed for a 100-year flood event to meet the Northwest Forest Plan and the Medford District RMP requirements. During road inventories, existing culverts are evaluated for future replacement to meet the 100-year flood event.

Streams where mining is ongoing are generally impacted in terms of dimension, profile and pattern as well as water quality. Mining operations typically will straighten the stream, change the channel configuration, and reduce the length (sinuosity). The amount of vegetation is reduced from natural conditions adjacent to the stream. This reduces fish habitat by simplifying stream characteristics, reducing available space, reducing stream structure, and increasing stream temperature during the low-flow period.

G. VEGETATION

1. Description

Data on BLM and non-federal land used to compile this section was collected in 1997. Data on Forest Service land used to compile this section was received from the Galice Ranger District of the Siskiyou National Forest. See Map 5, Dominant Vegetation in the Big Hog Watershed, Map 6, Seral Stages, and Map 7, Plant Series, and Map 8, Vegetation Condition Class. Table III-6 and III-7 summarize acreages of these attributes of the watershed.

Table III-6: Major Plant Series USFS, BLM and Private Land - 1997

Major Plant Series	USFS		BLM		USFS + BLM		non-federal		Total	
	Acres	%	Acres	%	Acres	%	Acres	%	Acres	%
Douglas-fir	14,953	38%	21,217	56%	36,170	47%	8,201	32%	44,371	43%
Jeffrey pine	284	1%	875	2%	1,159	2%	676	3%	1,835	2%
Non-Vegetated	0	0%	40	0.1%	40	0%	912	4%	952	1%
Non-Forest	0	0%	0	0%	0	0%	5,485	21%	5,485	5%
Ponderosa pine	0	0%	188	1%	188	.2%	10	0%	198	0.2%
White fir	330	1%	28	0.1%	358	1%	0	0%	358	0.4%
White Oak	403	1%	3,009	8%	3,412	5%	1,490	6%	4,902	5%
Tanoak	9,105	23%	255	1%	9,360	12%	0	0%	9,360	10%
Riparian Hardwood	0	0%	680	2%	680	1%	411	2%	1,091	1%
Douglas-fir/Pine	1,767	5%	8,287	22%	10,054	13%	8,270	32%	18,324	20%
Tanoak/Douglas-fir	12,082	31%	946	3%	13,028	17%	87	0.3%	13,115	14%
Douglas-fir / White fir	0	0%	2,153	6%	2,153	3%	32	0.1%	2,185	2%
Totals	**38,924**	**100%**	**37,678**	**100%**	**76,602**	**100%**	**25,574**	**100%**	**102,176**	**100%**

Table III-7: Vegetation Condition Class USFS, BLM and Private Land - 1997

Vegetation Condition Class	USFS		BLM		USFS + BLM		Non-Federal		Total	
	Acres	%	Acres	%	Acres	%	Acres	%	Acres	%
Non-Vegetated	nd	-	40	0.1%	-	-	910	4%	-	
Developed/ Non-Vegetated	nd	-			-	-	2	0%	-	
Developed/ Vegetated	-	-	-		-	-	5,627	22%	5,627	6%
Grass/Forb	nd	-	171	0.4%	-	-	131	1%	-	
Shrub	nd	-	705	2%	-	-	0	0%	-	
Hardwood	nd	-	3,252	9%	-	-	2,924	11%	-	
Early Seral	7,414	25%	817	2%	10,454	15%	61	0%	10,541	11%
Seedlings/ Saplings			2,223	6%			26	0%		

Table III-7: Vegetation Condition Class USFS, BLM and Private Land - 1997

Vegetation Condition Class	USFS		BLM		USFS + BLM		Non-Federal		Total	
	Acres	%	Acres	%	Acres	%	Acres	%	Acres	%
Poles (5 to 11")	6,418	21%	3,186	8%	22,434	33%	5,523	22%	37,431	40%
Large Poles (11 to 21")			12,830	34%			9,474	37%		
Mature (+21")	13,853	46%	14,454	38%	28,307	42%	896	4%	29,203	31%
Totals	**30,064**		**37,678**		**67,742**		**25,574**		**93,316**	

nd = not determined

The plant series listed below were identified and mapped within the Rogue - Recreation Watershed. Site productivity in terms of basal area per acre is described for each series. Basal area is defined as the area of the cross section of a tree stem near its base, generally at breast height, 4.5 feet above the ground and inclusive of bark (USDI-BLM 1994).

Douglas-fir	(*Pseudotsuga menziesii* ((Mirb.) Franco.))
Jeffrey Pine	(*Pinus jeffreyi* (Grev. & Balf.))
Ponderosa Pine	(*Pinus ponderosa* (Laws.))
White Fir	(*Abies concolor* ((Gord. & Glend.) Lindl.))
Tanoak	(*Lithocarpus densifloras*)
White Oak	(*Quercus garryana* (Dougl.))

2. Site Productivity

The following basal area production rates are on a per acre basis. Basal area in a plant series is not limited to the tree species that series is named for. For example, basal area in the Douglas-fir series can be from Douglas-fir, madrone, sugar pine, or any other tree species present on the site. Basal area is used as a relative measure of site productivity. For example, an area that can support 200 ft^2/acre of basal area is more productive than an area that can support 100 ft^2/acre of basal area.

Douglas-fir is the most common tree species in southwestern Oregon. Sites within the Douglas-fir series average 254 ft^2/acre (Atzet and Wheeler 1984). Douglas-fir tends to produce conditions that favor fire wherever it occurs. This species is self-pruning, often sheds its needles and tends to increase the rate of fuel buildup and fuel drying (Atzet and Wheeler 1982).

The Jeffrey pine series is confined to areas of ultrabasic (serpentine and serpentine influenced) soils (Atzet and Wheeler 1982). Serpentine areas dominated by Jeffrey pine may have the lowest productivity of any conifer series in the Klamath Province with an average basal area per acre of 83 ft^2/acre (Atzet and Wheeler 1984). While not considered important in terms of timber production, these sites are floristically diverse

supporting many special status plants. They also have value as unique habitats for a variety of wildlife species.

Forests in the ponderosa pine series average approximately 170 ft^2/acre of basal area. This series is relatively rare as ponderosa pine does not often play the role of a climax dominant (Atzet and Wheeler 1984). This series tends to occupy hot, dry aspects that burn frequently. Ponderosa pine regeneration is restricted by reducing the number of fire events. Due to the success of fire suppression over the last 70 years, overall cover of this series has decreased (Atzet and Wheeler 1982).

Western hemlock is present in the Rogue - Recreation Watershed (T35S, R9W, Section 1). This species grows in cool, moderate environments where moisture stress occurs late in the growing season (Atzet and McCrimmon 1990). Evapotranspirational demands are low. The average basal area for this series is 295 ft^2/acre. The fire regime is one of infrequent, high-intensity fires.

Sites in the white fir series are also considered productive with basal area averaging over 341 ft^2/acre (Atzet and Wheeler 1984). The white fir series is widespread, diverse and productive (Atzet and McCrimmon 1990). White fir's thin bark provides little insulation during low intensity underburns until tree diameter reaches at least eight inches. Moreover, the tolerant nature of white fir, which allows branches to survive close to the ground, makes the lower crown a ladder to the upper crown (Atzet and Wheeler 1982). Due to the success of fire suppression efforts over the last 70 years, white fir occupancy has increased.

In general tanoak sites are considered productive. Average total basal area for this series is 262 ft^2/acre (Atzet and Wheeler 1984). The tanoak series occurs where both soil and atmospheric moisture are plentiful. The series occurs most frequently on cooler aspects with fine textured soils (Atzet and Wheeler 1984). Fire is the principal inhibitor of dominance of individual tanoak trees (Tappeiner *et. al.*, 1990). Due to the success of fire suppression efforts over the last 70 years, overall presence of this species has increased.

The tanoak/Douglas-fir series is a mix of tanoak and Douglas-fir. There is not enough data to distinguish which species is climax.

The white oak series occurs at low elevations and is characterized by shallow soils. Although Oregon white oak is usually considered a xeric species, it also commonly occurs in very moist locations - on flood plains, heavy clay soils, and on river terraces. On better sites, white oak is out competed by species that grow faster and taller (Stein 1990). Average basal area is 46 ft^2/acre. Water deficits significantly limit survival and growth (Atzet and McCrimmon 1990). White oak has the ability to survive as a climax species as it is able to survive in environments with low annual or seasonal precipitation, droughty soils, and where fire is a repeated natural occurrence (Stein 1990). Fire events in this series are high frequency and low intensity (Atzet and McCrimmon 1990). Due to the success of fire suppression over the last 70 years, the prominence of this series has declined.

3. Landscape Patterns

The dominant plant series is Douglas-fir. White fir is present in the east and northeast part of this watershed. The western hemlock series has disappeared from the watershed (T35S, R5W, Section 1) but there was a western hemlock sighting in T34S, R5W, Section 13. The hemlock in Section 1 was listed as timber sale volume in 1947. A possible reason for the loss of the hemlock from this section is change in environmental conditions such that western hemlock no longer had a competitive advantage after the logging occurred. (The site became hotter and drier after an estimated 30 MBF per acre was harvested. The plant series is currently listed as Douglas-fir.)

The Rogue - Recreation Watershed is predominately Douglas-fir, Douglas-fir/pine, ponderosa pine, and white oak plant series. The Douglas-fir series is found in north facing portions of the watershed with the rest of the watershed having vegetation consistent with the hotter dryer conditions typical of inland valleys.

Most of the Rogue - Recreation Watershed is densely stocked pole stands. Sixty percent of the Rogue - Recreation Watershed stands have a range of diameters between 5 inches and 21inches DBH. Mature forest covers approximately 38% of BLM land within the watershed.

H. SPECIES AND HABITATS

1. Introduction

The responsibilities of the federal agencies include the active management of special status species and their habitats, survey and manage species and their habitat, special areas and native plants. The following are special status protection categories used as guidelines for management of special status species and their habitats.

Listed and proposed listed species are those species that have been formally listed by the USFWS as endangered or threatened or officially proposed for listing. The goal is to enhance or maintain critical habitats and increase populations of threatened and endangered plant species on federal lands. It is also to restore species to historic ranges consistent with approved recovery plans and federal land use plans after consultation with federal and state agencies.

Survey and Manage species were identified as needing special management attention by the Northwest Forest Plan ROD in Table C-3 (USDA/USDI ROD 1994). These species must be managed at known sites and located prior to ground-disturbing activities (Survey Strategy 1 & 2). Some species listed in the NFP need to be inventoried extensively, and, if identified, some of these sites need to be managed (Survey Strategy 3). A regional survey would be conducted on Survey Strategy 4 species.

Candidate and Bureau-Sensitive species are federal or state candidates and those species considered by the BLM to be of concern in becoming federal candidates. The goal is to manage their habitat to conserve and maintain populations of candidate and Bureau-sensitive plant species at a level that will avoid endangering species and the need to list any species as endangered or threatened by either state or federal

government.

State-listed species and their habitats are those plants listed under the Oregon Endangered Species Act. Conservation will be designed to assist the state in achieving their management objectives.

Bureau-Assessment species are those species considered by the state BLM office as important species to monitor and manage, but not on as crucial a level as candidate or Bureau-sensitive species. The goal is to manage where possible so as not to elevate their status to any higher level of concern.

BLM tracking species are not currently special status species, but their locations are tracked during surveys to assess future potential needs for protection.

2. Terrestrial

a. Botanical

Table III-8 lists Survey and Manage and special status plants found within the Rogue - Recreation Watershed. Fourteen special status or Survey and Manage species have been found in the watershed. Twelve populations of *Cypripedium fasciculatum,* two populations of *Cypripedium montanum* and twenty-two populations of *Allotropa virgata* have been located, along with eight populations of *Camassia howellii.* Thirteen populations of *Sedum moranii,* seven populations of *Arabis modesta* and five populations of *Lewisia cotyledon var. howellii* were found on rocky outcrops. Numerous Bureau Tracking and Bureau Watch species have also been found in the watershed including *Adiantum jordanii, Mimulus douglasii, Lewisia oppositifolia, Lithophragma heterophylla, Arabis aculeolata, Arabis koehleri var. stipitata, Castilleja brevilobata, Cypripedium californicum, Smilax californica, Perideridia howellii, Cardamine nuttallii var. dissecta, Festuca elmeri* and *Cryptantha milobakeri.*

Table III-8: Special Status Plants (Rogue - Recreation Watershed)

Species Name	Species Status	Habitat
Cypripedium fasciculatum	SM/SC/BS	moist mixed evergreen with filtered sun
Allotropa virgata	SM	mixed evergreen
Cypripedium montanum	SM	moist to dry mixed evergreen
Camassia howellii	SC/BS	dry serpentine openings
Sophora leachiana	SC/BS	disturbed areas, serpentine influenced soils
Sedum moranii	SC/BS	cliffs, rock outcrops
Microseris howellii	SC/BS	serpentine grasslands
Lewisia cotelydon var. howellii	SC/BS	serpentine cliffs, rock outcrops

Table III-8: Special Status Plants (Rogue - Recreation Watershed)

Species Name	Species Status	Habitat
Delphinium nudicaule	BA	moist, rocky slopes
Lotus stipularis var. stipularis	BA	disturbed areas, chaparrel
Arabis modesta	BA	cliffs, rock outcrops
Fritillaria glauca	BA	dry serpentine openings
Carex serratodens	BA	wetlands, riparian areas
Eschscholzia caespitosa	BA	valley/foothill dry flats, brushy slopes

SC = Species of Concern, SM = Survey and Manage species, BS = Bureau Sensitive, BA = Bureau Assessment

All of these populations were found during recent timber sale surveys, the total acreage of which constitutes only 20% of the BLM lands in the watershed. This high population frequency found in such a small portion of the watershed suggests that high potential exists for rare plants throughout this watershed. This is due to the high diversity of habitats.

Since little of the Rogue - Recreation Watershed has been surveyed, current conditions must be based on a discussion of potential habitats of the species that have been found. There are late-successional conditions in the watershed which provide habitat for the following species: *Cypripedium fasciculatum*, (Clustered Ladyslipper) (CYFA), *Cypripedium montanum*, (Mountain Ladyslipper) (CYMO) and *Allotropa virgata* (Candystick) (ALVI). According to Appendix J of the Northwest Forest Plan (1994), CYFA and CYMO are most likely found in areas with 60%-100% shade provided by older stands of various plant communities within Douglas-fir forests. It further states that although these species are not attached to a specific vegetation community, they are more importantly, dependent on specific microsite characteristics, including high percent shading, high moisture and undisturbed mychorrhizal connections in older age class forest. The plant series most likely to harbor these orchids within the Rogue - Recreation Watershed are Douglas-fir or Douglas-fir/white fir series in a mature condition class. Currently, 62% of the BLM land in the watershed falls into these plant series with only 38% in a mature condition class. The actual viable habitat for these species would be even smaller; limited to microsites with moister, north aspects, larger condition classes and 60%-90% canopy closure. *Allotropa virgata* is also found in late-successional habitats where conditions are drier and is linked to dead and down components of the forest ecosystem as well as undisturbed mychorrhizal connections. Without intensive field surveys it is difficult to determine the actual amount of habitat that exists for these three species in the watershed because microsite characteristics cannot be determined from vegetation maps.

The Douglas-fir plant series are mostly in over-dense stand conditions due to lack of fire. The watershed is at high risk for catastrophic fire which would virtually eliminate the Survey and Manage species dependent on late-successional conditions. Although the three species listed have been known to tolerate,

and possibly even thrive from low-intensity fire, it has also been shown that such plants will not survive high-intensity fire.

Serpentine areas can be found in the Rogue - Recreation Watershed, especially in the Picket Creek and Hellgate areas. The primary plant series for these areas is Jeffrey pine which covers 1.7% of BLM land in the watershed. Species such as *Camassia howellii, Sedum moranii, Arabis modesta, Fritillaria glauca, Microseris howellii* and *Lewisia cotyledon var. howellii* can be found in open serpentine areas or rock outcrops.

Although valley habitat and grasslands are limited in the Rogue - Recreation Watershed, open shrublands or chaparrel does occur more predominantly. Species dependent on openings in this habitat include *Eschscholzia caespitosa* and *Delphinium nudicaule.* This habitat could be threatened if lack of fire has caused shrub canopies to fill in.

Two special status plant species appear to thrive in disturbed areas (*Lotus stipularis var. stipularis* and *Sophora leachiana). Sophora leachiana* is an especially unique species, as it is a very narrow endemic found only in openings and disturbed areas on serpentine influenced soils in the vicinity of the Galice/Mount Peavine area, Picket Creek area and the eastern edge of the Kalmiopsis wilderness. It could be that human disturbance areas such as skid trails have taken the place of natural perturbations such as the natural fire cycle.

Invasion of noxious weeds could eventually affect special status plants. A thorough inventory of noxious weeds has not been completed in the watershed but their occurrence has been documented. They are most common in the forested area skid trails and roadsides have been invaded by such species as Canadian thistle, scotchbroom or meadow knapweed. These species are a threat because they compete with native vegetation, reducing plant diversity.

The most noxious weed in the watershed is probably purple loosestrife (*Lythrum salicaria).* This species is spreading along the banks of the Rogue River where upstream sources provide a continuous seed source during high water.

A major data gap is the lack of information regarding non-vascular plants in the watershed. Surveys have just begun in the Rogue - Recreation Watershed for both Survey and Manage and Protection Buffer species as required by the NFP. To date one Strategy 1 species, *Dendriscocaulon intricatulum,* has been found in the watershed. This new location has meant a large range extension for this rare species from that previously known. Again, the diversity of habitats could lend itself to a high diversity of non-vascular plants. Riparian areas will be of great importance for maintaining dispersal corridors for these species.

b. Wildlife

The Rogue - Recreation Watershed contains a diverse array of wildlife. As many as 11 species of bats, 12 species of amphibians, 18 species of reptiles, hundreds of species of birds, and many thousands of species

of insects may occur here. All but three indigenous mammals (grizzly bear, wolf and wolverine) are thought to have the potential to occur in the watershed.

The BLM and Forest Service are the principal federal agencies responsible for managing public lands within the watershed. Part of the agencies' responsibilities are the management of fish and wildlife and their habitat. Within the Rogue - Recreation Watershed there are several habitats of concern in the watershed and numerous unique features.

(1) Habitats

Wildlife habitats of southwest Oregon are extremely complex. Terrain, climatic factors and vegetation combine to create the diversity of habitats found from the valley floor to the peaks of the Siskiyou Mountains. The Rogue - Recreation Watershed is characterized by the steep rocky canyon of the Rogue River. This area is hot and dry in the summer and is dominated by a canyon live oak plant community. Except along the banks of the river, a few creek valleys and the southern portion of the watershed, very little flat terrain exists. Due to the limited amount of flat terrain, this watershed has seen a limited amount of urbanization in comparison to adjacent watershed. The majority of the watershed is dominated by coniferous forest. The age and the structure of these forests range from saplings to old growth. The forest in the watershed have a significant component of hardwood trees that contribute to structural and vegetative diversity. Habitats found throughout the watershed include meadows, riparian areas, chaparral, alder thickets, oak stands, sandy beaches, Jeffrey pine savannah and a variety of other unique areas.

The various plant communities and habitats support an array of native wildlife. Animals require food, water, shelter and space to breed and raise young during their lifetime. Some species have adapted to a particular habitat (specialists) while others utilize a great deal of different plant communities to fulfill their needs (generalists).

Habitats that are an issue in the Rogue - Recreation Watershed include late-successional forest, old-growth forest, meadows, pine stands, oak groves, Jeffrey pine savannahs, oak savannahs and riparian habitat. All of the previously mentioned habitats have been impacted by human activity in the watershed.

(a) Valley Habitats

The Rogue - Recreation Watershed is composed of numerous drainages flowing toward the mainstem of the Rogue River. These drainages are typified by a limited area of valley habitat, and steep timbered hillsides. The amount of valley habitat is naturally scarce in the watershed being limited to the southern portion of the watershed in the Limpy and Dutcher Creek drainages, with smaller amounts found in the Galice, Taylor and Pickett Creek drainages as well as along side of the mainstem of the Rogue River. Development and agricultural use is limited in the drainages but where flat terrain does exist, it for the most part has been developed. Therefore undisturbed native valley habitats are scarce, and occur primarily on federally-managed land. Currently, fire suppression is the largest threat to maintaining the remaining undisturbed valley habitat. Fire suppression has led to a reduction in the quantity and quality of these habitat which include oak savannahs, meadows, pine forest and chaparral. These habitats have been

identified as three of the five critical habitats by the Oregon/Washington neotropical bird working group. It is assumed further development of these habitats will have a negative impact on neotropical migrant birds.

Native valley habitats have shown some of the greatest decline of plant communities in southwestern Oregon. Due to the changing nature of private land management the remaining tracts of public land are critical in insuring that this habitat and the biodiversity it supports continues to be represented in the valley. These stands provide primary nesting habitat for acorn woodpeckers *(Melanerpes formicivorous)* and western bluebirds *(Sialia mexicana)* as well as winter range for blacktail deer *(Odocoileus hemionus)*. Smaller mammals using this habitat include raccoon *(Procyon lotor)* and grey fox *(Urocyon cinereoargenteus)*.

(b) Upland Habitats

Most of the federally-administered lands in the watershed are found above the valley floor. Here, forests dominate the landscape, with numerous species of conifers, hardwoods, shrubs, and herbaceous plants. Many of the hardwoods are berry and mast producers, that offer a rich food source for wildlife. Mast crop producers include California black oak *(Quercus kelloggii)*, Oregon white oak *(Quercus garryana)*, tanoak *(Lithocarpus densiflorus)*, and California hazel *(Corylus cornuta)*. Berry producing plants such as Pacific madrone *(Arbutus menziesii)* and manzanita *(Arctostaphylos spp.)* are also important crop producers for wildlife. Habitats within the uplands include old growth, meadows, riparian areas, chaparral, pine savannahs and oak stands that all add diversity to the forest. Natural disturbances are important in generating and maintaining a number of plant communities and habitats. Human caused disturbances such as logging, mining, and road building, have all affected the condition of the upland forest. Current condition of the forest determines wildlife species abundance and diversity. The shift from older, structurally diverse forests to younger, structurally simplified forests has benefitted generalists species, but has not been advantageous to species that depend on late-successional forest habitat. The most extensive disturbance activity in the upland portions of the watershed has been logging and mining. Currently, most private lands and county lands are in early seral stage to pole stage, with little mature forest. The condition of federal land varies from recent clearcuts to old-growth stands. Many of these stands are the result of past timber harvest and are structurally simplified in comparison to natural stands. The majority of the late-successional habitat is located in the Fish Hook/Galice and Taylor Creek LSRs. Late-successional stands located outside of these LSRs are often heavily fragmented and may not represent interior forest conditions due to past entries for forest management.

To facilitate timber extraction numerous roads were constructed throughout the uplands. Areas with high road density are of particular concern because roads have many negative impacts on wildlife. Roads lead to increases in vehicular/human disturbance, provide access for poaching and further fragment areas of late-successional habitat. The watershed has seen a large increase in the road densities on federal land since the second world war. Remaining areas with low road densities offer important refugia from human disturbance for species such as black bear.

(c) Aquatic Habitat

Riparian areas are one of the most heavily used habitats found in the watershed, both by humans and by wildlife. Many life cycle requirements of animals are met in these areas. Aquatic and amphibious species are intrinsically tied to these habitats, as are all the species that feed on these animals. Riparian habitats have been heavily impacted by mining, road building and logging. The riparian zone on private lands varies from mature stands of conifers to bare streambanks. Most of the private riparian is dominated by hardwoods and young conifers. The riparian zone on federally-managed lands are generally in better condition than private but still have been negatively impacted by past practices such as mining and timber harvest. The amount of water allowed to flow from the source to the Rogue River determines the usefulness of streams to aquatic species. During low flow periods water withdraws can determine the absence/presence of many aquatic species. Currently many native aquatic and amphibious species are no longer as prevalent as they probably were during pre-settlement time. In general, the riparian habitat in the watershed has been degraded from historic conditions and currently is less capable of supporting the historic species diversity.

(d) Specialized/Sensitive Habitats

Special and unique habitats are those habitats that are either naturally scarce (caves, springs, mineral licks, etc.), rare because of human influence on the environment (low elevation old-growth, oak/grasslands, etc.) or because of natural cycles (snags, meadow production, etc.). Often these habitats receive a greater level of use by wildlife than surrounding habitats, or are essential for certain aspects of a particular animal's life history (*e.g.*, hibernation). The Rogue - Recreation Watershed contains a number of unique habitats. The continued maintenance of these habitats will determine presence of many sensitive species. Sensitive habitats of issue are discussed in the following paragraphs.

Old-growth habitat is forest composed of a multi-canopy structure, dominated by large trees, snags and large down logs. Due to the wide variety of niches, these forests have a greater diversity of wildlife species than do younger forested stands. This habitat type is principally located in the Maple Gulch, Ash Creek area east of the Rogue River and in Taylor Creek and Rocky Gulch, Bailey Creek drainages west of the Rogue River. The patch size of the remaining stands partially determines the usefulness for some species of wildlife. Small, fragmented stands may offer refugia for species with limited home ranges, but do not provide optimal habitat for species with larger home ranges. Large stands (>100 acres) are very important contributors to maintaining the biodiversity of the watershed. Very little old-growth forest occurs on private land.

Meadows under federal ownership are uncommon in the Rogue - Recreation Watershed. Shallow soils, perched water tables, and old homesteads are the most common source of these meadows. Earlier in the century, many natural meadows were converted to agricultural land by homesteaders. Currently, the most significant threat to this habitat is tree encroachment due to the disruption of the natural fire cycle. Meadows are the primary habitat for a number of species such as California vole (*Microtus californicus*) and the western pocket gopher (*Thomomys mazama*) and are the primary feeding location for species such as the great grey owl (*Strix nebulosa*) and the American black bear (*Ursus americanus*).

Big game winter range in the Rogue - Recreation Watershed is in poor condition due to fire exclusion. Winter range is defined as land found below 2,000 feet in elevation, but may extend higher in elevation on southern exposed slopes. Ideally, these areas are a mixture of thermal cover, hiding cover and forage. Historically, the valley floor and adjacent slopes served as winter range for deer and elk. Most of the winter range has had an absence of fire for more than 50 years.

Dispersal corridors aid in gene pool flow, natural reintroduction and successful pioneering of species into previously unoccupied habitat. Generally these corridors are located in saddles, low divides, ridges, and along Riparian Reserves. Without such corridors many isolated wildlife habitats would be too small to support the maximum diversity of species. Numerous ridgelines within the watershed allow for localized dispersal as well as regional dispersal. Chrome Ridge allows for movement throughout the LSR into the Shasta Costa system towards the coast. The ridge that runs from Squaw Mountain to Onion Mountain allows for dispersal from the East IV/Williams-Deer LSR into the Taylor Creek LSR. Dispersal between drainages is also accomplished through low divides. For example the divide at the head of Taylor Creek into Briggs Creek basin allow for dispersal between the watersheds. Many of these key "flow" locations have the potential to support older forest, but currently do not due to past management activities and other disturbance. Other remaining blocks of older forest that contiguously run from the valley floor to the higher mountain ridges allow for "the elevator effect" which permits for seasonal dispersal for late-successional species. The Taylor and Bailey Creek as well as Rocky Gulch are example of such areas.

Oak woodlands/savannahs are a rich resource providing nesting habitat, mast crop production, big game wintering range and sheltered fawning areas. Many of these areas have been encroached by coniferous due to the exclusion of fire. Federally-administered stands of oak/grasslands are scattered throughout the watershed, with the majority of these stands being located in the Pickett creek drainage and along the Rogue River.

Mine adits play a critical role in the life history of many animals, providing shelter from environmental extremes, seclusion and darkness. Mines are the primary habitat for species such as the Townsend's big-eared bat *(Corynorhinus townsendii)*, a ROD buffer species and Bureau-Sensitive species. Other species such as the bushy-tailed woodrat*(Neotoma cinerea)* and the cave cricket *(Ceuthophilus spp.)* use caves as their primary residence. These sites are also used seasonally for a number of species such as swarm sites (breeding sites) for bats and den sites for porcupine *(Erethizon dorsatum)*. A number of mine adits are located on federal land. Maintaining these sites from disturbances are essential for preserving the presence of the species in the region. Recreational use of mines limit their value for wildlife, displacing easily disturbed species.

Deer fawning/elk calving areas are critical for successful maintenance of deer and elk populations. Key components include quality forage, water, cover, and gentle warm slopes. These areas should be free from human disturbance. Fawning areas on federally-administered lands are found in many small meadows scattered throughout the watershed, and in areas with southern exposures. Fawning areas on private land are found throughout the watershed but vary in quality due to disturbance.

(e) Special Status Species

There are 60 potential sensitive species in the watershed (19 birds, 13 mammals, 7 amphibians, 5 reptiles, 8 insects, and 6 mollusk). The habitat requirements for these animals vary from species to species.

The northern spotted owl is the only documented species listed under the Endangered Species Act known to nest within the watershed. It is suspected at least one pair of bald eagles is nesting near the Ennis riffle area along the Rogue River. Also a pair of peregrine falcons nest in the adjacent watershed and forage in the Rogue - Recreation Watershed. In addition to the known listed species there are also candidate species, Bureau-Sensitive species, ROD buffer species, as well as Survey and Manage species (see NFP, C-49).

Tables III-9 and III-10 list the known and potential special status species found in the watershed, along with legal status, and level of survey to date. This list includes species listed under the ESA, proposed for listing, and candidate species being reviewed by the USFWS. State listed species as well as Bureau assessment species and species listed in the ROD as "Buffer" species are also listed. (For more information on this list and habitat needs see appendix section.)

Table III-9: Rogue - Recreation Watershed Special Status Species (Vertebrates)

Common Name	Scientific Name	Presence	Status	Survey Level (5/97)
Gray wolf	*Canis lupus*	absent	FE,SE	none to date
White-footed vole	*Aborimus albipes*	unknown	BS,SP	none to date
Red tree vole	*Aborimus longicaudus*	present	SM	limited surveys
California red tree vole	*Aborimus pomo*	unknown	BS	none to date
Fisher	*Martes pennanti*	present	BS,SC	none to date
California wolverine	*Gulo gulo luteus*	reported	BS,ST	none to date
American marten	*Martes americana*	unknown	SC	none to date
Ringtail	*Bassacriscus astutus*	present	SU	none to date
Peregrine falcon	*Falco peregrinus*	unknown	FE,ST	none to date
Bald eagle	*Haliaeetus leucocephalus*	seasonally	FT,ST	none to date
Northern spotted owl	*Strix occidentlis*	present	FT,ST	limited surveys
Northern goshawk	*Accipiter gentilis*	unknown	BS,SC	some surveys
Mountain quail	*Oreortyx pictus*	present	BS	none to date
Pileated woodpecker	*Dryocopus pileatus*	present	SC	none to date
Lewis' woodpecker	*Melanerpes lewis*	unknown	SC	none to date
White-headed woodpecker	*Picoides albolarvatus*	unknown	SC,BF	none to date
Flammulated owl	*Otus flammeolus*	unknown	SC,BF	none to date

Table III-9: Rogue - Recreation Watershed Special Status Species (Vertebrates)

Common Name	Scientific Name	Presence	Status	Survey Level (5/97)
Purple martin	*Progne subis*	unknown	SC	none to date
Great gray owl	*Strix nebulosa*	unknown	SV,SM	limited surveys
Western bluebird	*Sialia mexicana*	present	SV	none to date
Acorn woodpecker	*Melanerpes formicivorus*	suspected	SU	none to date
Tricolored blackbird	*Agelaius tricolor*	unknown	BS,SP	none to date
Black-backed woodpecker	*Picoides arcticus*	unknown	SC,BF	none to date
Northern pygmy owl	*Glaucidium gnoma*	present	SU	limited surveys
Grasshopper sparrow	*Ammodramus savannarum*	unknown	SP	none to date
Bank swallow	*Riparia riparia*	migratory	SU	none to date
Townsend's big-eared bat	*Corynorhinus townsendii*	present	BS,SC	limited surveys
Fringed myotis	*Myotis thysanodes*	present	BS,SV,BU	limited surveys
Yuma myotis	*Myotis yumanensis*	present	BS	limited surveys
Long-eared myotis	*Myotis evotis*	present	BS,BU	limited surveys
Hairy-winged myotis	*Myotis volans*	present	BS	limited surveys
Silver-haired bat	*Lasionycterus noctivagans*	suspected	BF	limited surveys
Pacific pallid bat	*Antrozous pallidus*	unknown	SC	limited surveys
Western pond turtle	*Clemmys marmorata*	present	BS,SC	incidental sightings
Del Norte salamander	*Plethodon elongatus*	unknown	BS,SV,SM,BF	limited surveys
Foothills yellow-legged frog	*Rana boylii*	suspected	BS,SU	limited surveys
Red-legged frog	*Rana aurora*	unknown	BS,SU	none to date
Clouded salamander	*Aneides ferreus*	suspected	SC	limited surveys
Southern torrent salamander (variegated salamander)	*Rhyacotriton variegatus*	unknown	BS,SV	limited surveys
Black salamander	*Aneides flavipunctatus*	suspected	SP	limited surveys
Sharptail snake	*Contia tenuis*	suspected	SC	none to date
California mountain kingsnake	*Lampropeltis zonata*	present	SP	incidental sightings
Common kingsnake	*Lampropeltis getulus*	present	SP	incidental sightings
Northern sagebrush lizard	*Sceloporus graciosus*	unknown	BS	none to date
Tailed frog	*Ascaphus truei*	suspected	SV	none to date

STATUS ABBREVIATIONS:
FE--Federal Endangered
FT--Federal Threatened
SV--ODFW Vulnerable
SP--ODFW Peripheral or Naturally Rare
SU--ODFW Undetermined
SE--State Endangered
SC--ODFW Critical
BF--Buffer Species
BS--Bureau Sensitive
ST--State Threatened
SM--Survey and Manage
FP--Federal Proposed
FC--Federal Candidate

Table III-10: Rogue - Recreation Watershed Special Status Species (Invertebrates)			
Common Name	**Presence**	**Status**	**Survey Level** (as of 5/97)
Burnells' false water penny beetle	unknown	BS	none to date
Denning's agapetus caddisfly	unknown	BS	none to date
Green Springs Mtn. farulan caddisfly	unknown	BS	none to date
Schuh's homoplectran caddisfly	unknown	BS	none to date
Obrien rhyacophilan caddisfly	unknown	BS	none to date
Siskiyou caddisfly	unknown	BS	none to date
Alsea ochrotichian micro caddisfly	unknown	BS	none to date
Franklin's bumblebee	unknown	BS	none to date
Oregon pearly mussel	unknown	BS	none to date

BS = Bureau Sensitive

(g) Survey and Manage Species

Tables III-11 and III-12 present the species that are to be protected through survey and management guidelines as outlined in the NFP. This table also describes the level of protection and the amount of surveys conducted to date. It is suspected that the current late-successional reserve network will not meet the needs of these species, such that further restrictions within matrix lands are necessary to ensure long-term viability of their populations. All known sites will receive some level of immediate protection.

Table III-11: Survey and Manage Species & Buffer Species in the Rogue - Recreation Watershed		
Species	**Presence**	**Protection Level**
Del Norte salamander *@ *(Plethodon elongatus)*	present	Manage known sites and survey prior to activities, within matrix land buffer length of one potential site tree or 100 feet whichever is greater.
White-headed woodpecker* *(Picoides albolarvatus)*	unknown	On matrix land no cutting snags 20" DBH or over. Maintain green trees to provide for 100% population potential.
Black-backed woodpecker* *(Picoides pubescens)*	unknown	On matrix land no cutting snags 20" DBH or over. Maintain green trees to provide for 100% population potential.
Flammulated owl* *(Otus flammeolus)*	unknown	On matrix land no cutting snags 20" DBH or over. Maintain green trees to provide for 100% population potential.
Great gray owl@ *(Strix nebulosa)*	unknown	1/4 mile protection zone around nest sites, survey prior to activities, 300-foot buffers of meadow and natural openings.
Red tree vole@ *(Aborimus pomo)*	present	Manage known sites and survey prior to activities.

* = Buffers species, @ = Survey and Manage

Table III-12: Survey and Manage Molluscs Species	
Species	
Blue-grey taildropper *Prophysaon coeruleum*	Present in watershed
Papillose taildropper *Prophysa on dubium*	Unknown if present in the watershed
Chace sideband *Monadenia chaceana*	Unknown if present in the watershed
Oregon megomphix *Megophix hemphilli*	Unknown if present in the watershed
Helminthoglypta hertleini	Unknown if present in the watershed
Tehama chaparral Trilobopsis tehamana	Unknown if present in the watershed

(h) Threatened or Endangered Species

Northern Spotted Owl (Threatened) - The northern spotted owl (threatened) is the only known species listed under the ESA known to nest in the watershed. There are 16 known centers of activity, eight with 100 acre cores, seven in the LSR, one outside the LSR and do not have cores, and another 3 sites outside the watershed whose provincial home range (1.3 miles radii) may be affected by activities occurring inside the watershed (see appendix for the list of sites and results of nesting surveys). An active site is one in which a territorial single or pair has occupied the site at least once since 1985. Surveys for northern spotted owls have been conducted since the mid-1970's within the watershed. Early surveys were opportunistic until 1985 when areas were surveyed prior to a proposed management activity.

The USFWS uses thresholds for suitable habitat around spotted owl sites as an indication of the site's viability and productivity. Thresholds have been defined as 50% of the area within 0.7 mile of the center of activity (approximately 500 acres) and 40% of the area within 1.3 miles (approximately 1,388 acres).

Table E-3 in Appendix E describes the condition of the sites within the watershed or adjacent to the watershed. Three sites within the watershed exceed the 1,388 acres necessary for long-term viability. Maintenance and development of late-successional forest conditions within the provincial home range for these sites should be considered a high priority.

Spotted owl habitat managed by the BLM has been analyzed using the McKelvey Rating System. The McKelvey Rating System is based on a model that predicts spotted owl population based on habitat availability (see Appendix D for more information on this system). Stands were examined for criteria such as canopy layering, canopy closure, snags, woody material and other features. Biological potential of a stand to acquire desired conditions is also taken in consideration. During the spring of 1997 stands were visually rated and placed into the six categories. Map 9 displays the results of this study. Table E-3 summarizes the amount of habitat available for spotted owls in the watershed on lands administered by the BLM, and non-federal lands (State of Oregon, Josephine County and private). There are 4,229 acres of spotted owl nesting, roosting and foraging habitat (McKelvey Rating #1) found on BLM-administered land in the watershed (11% of watershed). The largest contiguous blocks are located in Bailey Creek, Rocky

Gulch and the Maple Gulch drainages. Other large blocks of optimal habitat are located in Panther Creek and Zig Zag Creek.

The BLM portion of the Rogue - Recreation Watershed has 4,657 acres (12.3% of watershed) of spotted owl roosting, and foraging habitat (McKelvey rating #2). The largest patches are found in the Rocky Gulch, Argo Creek, Smith Creek, Maple Gulch and Cooksie Gulch drainages.

Dispersal habitat for spotted owls is defined as stands that have a canopy closure of 40% or greater, and open enough for flight and predator avoidances. This habitat is scattered though out the watershed except in the south eastern corner.

(iii) Private and County Land

In 1997, an effort was made by the BLM to classify the forest type using the McKelvey model on private and county lands in the watershed. This information was largely gathered through photo interpretation, ground truthing and roadside reconnaissance. This endeavor gives a fairly accurate depiction of the status of private, state and county lands. Table III-13 displays the amount of available habitat for northern spotted owls on private, state and county land in the watershed. There are nine acres of optimal habitat and 645 acres of spotted owl roost/foraging habitat on private land within the watershed. Most of the private land does not have the potential to support late-successional forest habitat (12,749 acres). Currently there are 2,139 acres of private land functioning as dispersal habitat for the northern spotted owl. The State of Oregon has one of the largest patches of suitable roosting and foraging habitat in T34S, R7W, Section 6, along side of the Rogue River.

The McKelvey Rating System is as follows:

Class 1- Spotted owl nesting, roosting, and foraging habitat
2- Spotted owl roosting and foraging
3- Currently does not meet 1 or 2 criteria
4- Will never meet 1 or 2 criteria
5- Currently does not meet 1 or 2, but meets dispersal
6- Will never meet 1 or 2 but meets dispersal

Table III-13: McKelvey Rating Classes

McKelvey Class	BLM Lands		Non-federal Lands		BLM + Non-federal Lands	
	Acres	Percent in watershed	Acres	Percent in watershed	Acres	Percent in watershed
1	4,229	4.5%	9	0%	4,238	4.5%
2	4,657	4.9%	645	0.06%	5,302	5.6%
3	13,196	14%	10,032	10.7%	23,228	24.8%
4	5,042	5.4%	12,749	13.6%	17,791	19%
5	10,207	10.9%	1,949	2%	12,156	13%
6	347	0.03%	190	0.02%	537	0.05%

*This information was collected during the summer of 1997, and may not reflect current condition. Federal acres managed by the Forest Service are not reflected in the table.

Marbled Murrelet (Threatened) - Critical habitat for marbled murrelet was designated by the U.S. Fish & Wildlife Service (USFWS) in May of 1996. No land within the Rogue - Recreation Watershed was identified as critical habitat, but federal agencies are still responsible for determining absence/presence in suitable habitat within 50 miles from the coast. Nesting habitat for marbled murrelet consists of older forested stands with trees that have large moss-covered limbs and high (70+%) canopy closure. This habitat is further defined by its distance from the coast. Based on microstorms information and field verification of McKelvey rating approximately 14,780 acres of suitable Marbled murrelet habitat found on lands managed by the BLM in the watershed. This land, for the most part, corresponds with spotted owl suitable/optimal habitat (see Map 9). There are no known nest locations within the Rogue - Recreation Watershed. It is unknown at this time if the stands that contain components for marbled murrelet would be used by them. These sites are generally warmer and drier then those lands located closer to the coast that are occupied by nesting murrelets. The BLM has conducted surveys in proposed projects areas and have not detected these birds.

Bald Eagles (Threatened) - At this time there are no known nest sites documented within the watershed but it is suspected that a pair is nesting near Ennis riffle. Nesting habitat occurs on federally-administered land as well as state land along the Rogue River. Preferred nesting habitat consist of older forests, generally near water, with minimal human disturbance.

Peregrine Falcon (Threatened) nest on ledges located on cliff faces. There are no known historic or current peregrine falcon nests in the watershed but a pair does occur in the adjacent watershed and forage throughout the Rogue - Recreation Watershed. Habitat for nesting does occur along the cliff faces within the watershed.

(j) Other Species of Concern

Neotropical Migratory Birds - A number of neotropical birds are known to inhabit the Rogue - Recreation Watershed. Neotropical migrants are species of birds that winter south of the Tropic of Cancer, and breed in North America. More then twenty years of Breeding Bird Surveys (BBS), Breeding Bird Census (BBC), Winter Bird Population Study, and Christmas Bird Counts indicate that many species of birds are experiencing a precipitous decline. This is particularly true for birds that use mature and old-growth forest either in the tropics, in North America or both (DeSante & Burton 1994). Rates of decline are well documented for birds on the east coast of North America, and less so on the west coast. In 1992 the BLM signed a multi-agency agreement called "Partners in Flight." The purpose of this program is to establish a long-term monitoring effort to gather demographic information. This monitoring will establish the extent that deforestation and forest fragmentation have on temperate breeding bird populations.

The Rogue - Recreation Watershed contains a number of neotropical migrants that utilize various habitats. Studies conducted on the Medford District have found that neotropical migrants comprise between 42% and 47% of the breeding species at lower elevation forest dominated by Douglas-fir (Janes 1993). In higher elevation forests dominated by white fir, neotropical migrants are less abundant contributing to a smaller portion of the bird species present. In the fall of 1994 a fall banding station was established within the watershed. In the spring of the following year a Migratory Avian Productivity and Survivorship (MAPS) station was established. The purpose of these projects were to establish baseline data on presence and absence of species as well as their productivity (birth rate) and survivorship (death rate). A number of neotropical birds have been detected since 1994. Table III-14 lists the known and suspected neotropicals found in the watershed, habitat used, and national population trends. Habitats of particular concern are valley brushfields, old-growth, riparian, and oak woodlands communities. It is important to keep in mind neotropicals will often use more than one habitat type during various seasons. Overall, 46% of these birds are habitat generalists using four or more habitat types, while 34% are habitat specialists utilizing one or two habitats.

Table III-14: Neotropical Bird Potential in Rogue - Recreation Watershed

COMMON NAME	PRESENCE	TREND*
Green-winged teal	unknown	insufficient data
Sora	unknown	insufficient data
Turkey vulture	present	decline
Osprey	present	stable or increasing
Flammulated owl	unknown	insufficient data
Common nighthawk	present	insufficient data
Rufous hummingbird	present	decline
Calliope hummingbird	unknown	insufficient data
Western kingbird	present	insufficient data

Table III-14: Neotropical Bird Potential in Rogue - Recreation Watershed

COMMON NAME	PRESENCE	TREND*
Ash-throated flycatcher	present	insufficient data
Western wood-pewee	present	decline
Olive-sided flycatcher	present	decline
Hammond's flycatcher	present	insufficient data
Dusky flycatcher	present	insufficient data
Pacific-slope flycatcher	present	insufficient data
Vaux's swift	present	decline
Tree swallow	present	insufficient data
Northern rough-winged swallow	present	insufficient data
Violet-green swallow	present	decline
Cliff swallow	present	insufficient data
Barn swallow	present	decline
House wren	present	insufficient data
Blue-gray gnatcatcher	present	insufficient data
Swainson's thrush	present	decline
Solitary vireo	present	insufficient data
Warbling vireo	present	insufficient data
Townsend's warbler	present	insufficient data
Hermit warbler	present	insufficient data
Black-throated gray warbler	present	insufficient data
Nashville warbler	present	insufficient data
Macgillivray's warbler	present	insufficient data
Yellow warbler	present	insufficient data
Orange-crowned warbler	present	decline
Common yellowthroat	present	stable/increase
Yellow-breasted chat	present	insufficient data
Wilson's warbler	present	decline
Brownheaded cowbird	present	decline
Northern oriole	present	decline
Western tanager	present	decline

Table III-14: Neotropical Bird Potential in Rogue - Recreation Watershed

COMMON NAME	PRESENCE	TREND*
Chipping sparrow	suspected	decline
Green-tailed towhee	present	stable/increase
Black-headed grosbeak	present	stable/increase
Lazuli bunting	present	insufficient data

* Based on information from Partners in Flight in Oregon and might not necessarily represent nationwide figures.

Unusual sightings - Due to the rocky terrain and mine shafts the Rogue - Recreation Watershed is a strong hold for ringtails in Southern Oregon. These nocturnal animals are spotted frequently along the Rogue River and the Galice Creek Road.

A fisher, a rare carnivore, was seen by a resource area biologist crossing the Galice access road in December, 1996. This was the first report of this elusive animal within the watershed. Another elusive carnivore, a wolverine, was reportedly seen in Chrome Ridge in the 1960's. The reliability of this sighting is unknown. This animal naturally occurs at low densities and may have home ranges as large as 2,000 km^2.

Game Species--Species of game animals located within the Rogue - Recreation Watershed include: elk, blacktailed deer, black bear, mountain lion, wild turkeys, ruffed grouse, blue grouse, grey squirrels, mountain and valley quail. The watershed is located in the Chetco game management unit. Management of game species are the responsibility of the Oregon Department of Fish and Wildlife. The entire watershed is open to hunting during the appropriate season for game species. Information from the Oregon Department of Fish and Wildlife (ODFW) indicates that blacktailed deer populations are stable overall and meeting department goals. Elk are present in the watershed, with recent reports of animals ranging throughout the watershed.

Black bear populations are extremely hard to monitor due to their secretive nature. The population in the watershed appears to be stable. Cougar sightings in the watershed have increased with their overall population on the rise.

Grouse and quail had a poor nesting year in 1998 due to the late spring rains.. The population of these birds is cyclic depending on weather conditions. Long-term trends appear to be stable. Wild turkeys have not been introduced in this watershed, but appear to have established themselves from adjacent watersheds.

In general, game species are generalists that benefit from edge habitats. Past land management practices both on private and federal lands have increased the overall amount of forest edge within the watershed. In addition, the amount of roads has also increased which in turn impacts the suitability of all habitat types. High road densities have shown to have negative affects on deer and elk populations, and lead to increase poaching opportunities. For these species numbers could be expected to increase with a decrease in the road densities. Remaining unroaded sections offer key refugia for these species.

Band-tail pigeons *(Columba fasciata)* are known to occur in the watershed. These birds have shown a precipitous decline in population throughout its range since monitoring began in the 1950's (Jarvis *et al* 1993). These birds are highly prized as a game species and restrictive hunting regulations have not led to an increase in bird populations. Habitat alteration due to intense forestry practices may partially explain their decrease in population and ongoing research is now trying to answer this question (Jarvis *et al* 1993). Band-tail pigeons are highly mobile and utilize many forest habitat types. Preferred habitat consists of large conifers and deciduous trees interspersed with berry and mast producing trees and shrubs. In the spring and fall large flocks are seen migrating through the watershed. The birds use this higher elevation feeding on blue elderberries, manzanita berries, and Pacific madrone berries. With the exclusion of fire from the landscape many stands of mast crop producing plants have been negatively impacted.

Cavity dependent species such as western bluebirds and northern pygmy owls *(Glaucidium gnoma)* which use downed logs are of special concern in the watershed because of past silvicultural practices. These practices in the past have focused on even-aged stands that have resulted in deficits of snags and down logs in areas previously harvested. Fire suppression also has a negative effect on the amount of snags in the watershed. Fires, insect infestations and other disturbance events are important generators of snags. Species associated with this habitat type have also declined.

Exotic Species - Many non-native species have become established in the watershed. Introduced exotic species compete with native species for food, water, shelter and space. Bullfrogs (*Rana catesbeiana*) directly compete with native frogs, and consume young western pond turtles (*Clemmys marmorata*). Opossums (*Dedelphis virginiana*) occupy a similar niche with our native stripped skunk (*Mephitis mephitis*) and raccoon (*Procoyon lotor*). They also consume young birds, amphibians and reptiles. Other introduced species include European starlings (*Sturnus vulgaris*), ring-necked pheasants (*Phasianus colchicus*) and turkeys (*Meleagris gallopavo*). These species have some negative impacts on native flora and fauna.

3. Aquatic Habitats and Species

a. Special Status Species

The threatened coho salmon (*Oncorhynchus kisutch*) is the only federally-listed fish within the Rogue - Recreation Watershed Analysis area. There are several other special status species present within the watershed whose habitat requirements overlap the requirements of the coho salmon.

Table III-15 lists Special Status and Federally-Threatened Aquatic Species inhabiting the Rogue - Recreation Watershed.

Table III-15: Special Status and Federally -Threatened Aquatic Species

Species	Status
Steelhead	• Federal Candidate in Oregon • Oregon Natural Heritage Program* (ONHP) Status List 1 • State of Oregon "vulnerable"
Chinook Salmon	• Federally Proposed Threatened in Oregon • Oregon Natural Heritage Program (ONHP) Status List 3 • State of Oregon "critical" • Critical Habitat Proposed
Cutthroat Trout	• Federal Candidate in Oregon and Washington • Oregon Natural Heritage Program (ONHP) Status List 3 • State of Oregon "vulnerable"
Reticulate Sculpin	• Bureau Tracking in Washington
Coho Salmon	• Federally Threatened All Stocks south of Cape Blanco • Oregon Natural Heritage Program (ONHP) Status List 1 • State of Oregon "critical"
Pacific Lamprey	• Federal Category 2 (USDI 1994)

* **Oregon Natural Heritage Program (ONHP) Status**

List 1: Taxa that are threatened with extinction or presumed to be extinct throughout their entire range.

List 2: Taxa that are threatened with extirpation or presumed to be extirpated from the state of Oregon.

List 3: Species for which more information is needed before status can be determined, but which may be threatened or endangered in Oregon or throughout their range.

List 4: Taxa which are of concern, but are not currently threatened or endangered.

b. General

Large wood contributes to the riparian and stream, habitat, shade and nutrients for terrestrial and aquatic insects. Large woody material, especially key pieces (≥ 24" diameter), is important for creating habitat complexity for rearing juvenile anadromous fish and cover for adults during migration. Stream meander is important for dissipating stream velocity and increasing habitat for juvenile fish winter refuge, especially for coho salmon. Adult and juvenile fish production can also be limited from migration barriers such as road culverts. Yearling juvenile fish can move miles within one watershed, especially during summer months when they seek cool waters. Excessive sedimentation especially delivered at wrong time intervals can delay adult migration and spawning and suffocate eggs in the redds. Suspended sediment can cause gill damage leading to secondary infections on over-wintering juvenile fish which are stressed from the lack of sufficient over-winter habitat to escape high water velocities.

Roads next to streams in the Stratton, Hog, and Pickett Creeks drainages disconnect streams from the floodplain, impede stream meander and act as heat sinks which transfer heat to the riparian area with consequent increases stream in water temperature.

Timber harvesting and the presence of roads accelerate surface water runoff and erosion of sediment into the streams, resulting in decreased insect and fish production.

The cumulative effects of management activities have substantially altered the timing and quantity of erosion and changes in stream channels, all which have impacted fish production at one time or another. Streams and riparian areas on federal lands appear to be in much better condition than streams on non-federal lands. During low flow periods, water flows from federal lands and in some areas is totally withdrawn for irrigation, leaving the streambed dry.

c. Class I, II, III and IV Stream Conditions (Specific/Stream Channel and Riparian Area)

Table III-16 summarizes habitat conditions in the Class I-IV streams in the watershed for which ODFW has completed physical habitat surveys.

Table III-16: Class I - IV (Stream Habitat Conditions)

Stream	Fish Bearing (Y/N)	Key Pieces LWD	LWD levels	Sediment levels within spawning gravels	Canopy Closure	Pool Freq.	Residual Pool Depth	Avg. Gradient (%)
Bailey Creek	N	U	U	A	U	D	A	19
N. Fork Rocky Gulch	Y	A	U	U	U	A	A	15
S. Fork Rocky Gulch	Y	A	U	U	U	A	U	15
Little Zig Zag Creek	N	A	U	D	U	U	U	17
Zig Zag Creek	N	U	U	D	U	U	U	15
Pickett Creek	Y	U	U	A	U	D	A	5
Panther Gulch	Y	U	U	A	U	U	U	7
Hog Creek	Y	A	U	U	A	A	U	4.5
Stratton Creek	Y	A	U	U	U	U	U	8
Little Stratton Creek	Y	U	U	A	A	U	U	5
Centennial Gulch	Y	A	A	A	A	A	U	8.5

Table III-17: Oregon Department of Fish and Wildlife Habitat Benchmarks

Habitat Type	Undesirable (U)	Adequate (A)	Desirable (D)
LWD pieces/100 m stream length	< 10	χ	> 20
Key pieces LWD (≥ 60 cm diameter, ≥ 10 m length) /100 m stream length	< 1	χ	> 3
Sediment Levels (Percent silt in spawning gravels)	> 20	χ	< 10
Canopy Closure (Percent)	< 70	χ	> 75
Pool Frequency (Channel Widths Between Pools)	> 20	χ	5-8
Residual Pool Depth (m)	< 0.5	χ	> 1.0

Baily Creek is a perennial, high gradient non-fish bearing stream. There is a 37-foot high falls located one-quarter mile upstream from the mouth of the Rogue River. The stream channel is constrained by bedrock with a steep, narrow valley.

North Fork Rocky Gulch is a perennial, high gradient fish bearing stream, characterized by rapids and cascades. Active mining is occurring within the channel and on adjacent hillslopes.

South Fork Rocky Gulch is a perennial, high gradient fish bearing stream characterized by cascades. There is an unscreened irrigation diversion, at river mile 1.1 which diverts 50% of the stream's flow.

Little Zig Zag Creek is an intermittent, high gradient non-fish bearing stream.

Zig Zag Creek is an intermittent, high gradient non-fish bearing stream. There are several six to ten foot falls which block fish migration in lower Zig Zag Creek.

Panther Gulch is a moderately high gradient, intermittent fish bearing stream.

Pickett Creek is a perennial fish bearing stream characterized by two distinct reaches. The first 2.6 stream miles are low gradient. The second reach is high gradient. There were 14 BLM fish habitat structures added to Pickett Creek in 1972. In 1986, the BLM added ten v-shaped log weirs, and blasted nine holding pools in bedrock. The structures are barriers to juvenile salmonids. However they create rearing pools for juveniles, and hold back essential spawning gravels. The habitat improvement structures have been added to mitigate for the loss of large wood due to past activities within the Riparian Reserves of Pickett Creek. Canopy closure is a limiting factor within the Riparian Reserves of the Pickett Creek sub-basin. Summer water temperatures exceed the Oregon Department of Environmental Quality (ODEQ) standards.

Pickett Creek Tributary is an intermittent, high gradient fish bearing stream.

Hog Creek is a perennial, fish bearing stream with a moderate gradient.

Stratton Creek is a perennial, fish bearing stream with a moderate to high gradient. The stream's lower reach gradient is high. There are several waterfalls located at mile 1.0, which are barriers to anadromous fish.

Centennial Gulch is a perennial, high gradient fish bearing stream.

Taylor Creek is identified as a Tier 1 subwatershed by the Final Supplemental Environmental Impact Statement (SEIS) on Management of Habitat for Late-Successional and Old-Growth Forest Related Species within the Range of the Northern Spotted Owl. The Taylor Creek subwatershed contributes directly to the conservation of at-risk anadromous salmonids, particularly the coho salmon. Spawning gravels are abundant in Taylor Creek, and large wood has been the limiting factor to salmonid populations. Taylor Creek has been the site of numerous restoration projects to restore historic levels of large wood, and improve salmonid habitat (USFS 1995).

d. Large Woody Material

Streams in the Rogue - Recreation Watershed typically have the same primary factors limiting salmonid production: 1) Instream habitat complexity is lacking in large woody debris, greater than or equal to 24 inches in diameter and the length should be equal to or greater than the bankfull width; 2) stream shade less than 60%; 3) lack of mature trees, especially conifers, >32" in diameter within 100 feet from the stream; 4) the amounts of coarse wood will vary depending on the plant series.

Large wood is an important if not critical component of stream habitat. It plays a critical part in determining the productivity of the stream. It is an important determinate of such things as stream hydraulics, microsite habitat conditions, feeding substrate, and pool and drop features. The Southwest Oregon Late-Successional Reserve Assessment (USDA and USDI 1994) has listed the following (Table III-18) as the minimum levels for large woody material after stand replacement (fire with timber salvage) and non-stand replacement (commercial thinnings) events (per acre basis). These should be the long-term target levels for the Rogue - Recreation Watershed.

Table III-18: Coarse Wood target levels by Plant Series		
Plant Series	**Stand Replacement Event**	**Non-Stand Replacement Event**
Douglas-fir Tanoak Hemlock	15 pieces > 20 feet long and > 16 inches in diameter (small end);snags >24 inches in diameter (average):3.4 to 4.2	≤ 20 pieces > 20 feet long and > 16 inches in diameter (small end); snags: retain all
Jeffrey Pine	10 pieces > 20 feet long and > 16 inches in diameter (small end);snags >12 inches in diameter (average):3.4 to 4.2	≤ 20 pieces > 20 feet long and > 16 inches in diameter (small end); snags: retain all
Ponderosa Pine	10 pieces > 20 feet long and > 16 inches in diameter (small end);snags >24 inches in diameter (average):3.4 to 4.2	≤ 20 pieces > 20 feet long and > 16 inches in diameter (small end); snags: retain all
White Fir POC	12 pieces > 20 feet long and > 16 inches in diameter (small end);snags >30 inches in diameter (average):3.4 to 4.2	≤ 20 pieces > 20 feet long and > 16 inches in diameter (small end); snags: retain all
White Oak	Unknown	Unknown

e. Macroinvertebrates

Macroinvertebrate health within the Rogue - Recreation Watershed analysis is low. There are many factors which have contributed to this current condition. The lack of large, instream woody debris causes a decrease in the ability of the stream to hold back detritus and nutrients upon which the macroinvertebrates are dependent. Additionally, without large wood to dissipate energy from high peak flows, winter scour has altered the macroinvertebrate habitat. The decline in canopy cover has increased water temperatures and decreased water quality. Intolerant species of macroinvertebrates have disappeared from Galice, North Fork Galice, Pickett and Hog Creeks.

Table III-19: Macroinvertebrate Condition within the Rogue - Recreation Watershed			
Stream	**Erosional Habitat**	**Margin Habitat**	**Detritus Habitat**
Galice Creek	low	low	low
N. Fork Galice Creek	moderate	low	low
Hog Creek	low	very low	low
Pickett Creek	low	low	low

Source: BLM surveys (1995-96)

Table III-20: Macroinvertebrate Bioassessment Scores (Percent)			
	Erosional Habitat	**Margin Habitat**	**Detritus Habitat**
Very High	90-100	90-100	90-100
High	80-89	80-89	80-89
Moderate	60-79	70-79	70-79
Low	40-59	50-69	50-69
Very Low	< 40	< 50	< 50

Source: Aquatic Biology Associates 1993

f. Distribution and Abundance

Table III-21 summarizes the fish bearing streams within the watershed. See also Maps 12 and 13.

Table III-21: Fish Bearing Streams within the Rogue - Recreation Watershed (Miles)				
Stream	**Chinook**	**Coho**	**Steelhead**	**Resident Trout**
North Fork Rocky Gulch				1.0
South Fork Rocky Gulch				1.0
Pickett Creek		1.5	3.5	6.5
Panther Creek			1.25	1.25
Hog Creek			1.5	4.0
Stratton Creek			1.0	7.0
Little Stratton Creek				1.0
Centennial Gulch				1.5
Ash Gulch				0.5
Maple Gulch				1.0
Paint Creek				0.75
Delta Creek				0.75
Shan Creek		.25	1.5	1.75
Limpy Creek		3.0	4.0	4.0
Dutcher Creek		2.0	2.0	3.0
Galice Creek	2.0	3.0	3.0	3.0
South Fork Galice Creek		2.0	3.0	5.0
North Fork Galice Creek			2.8	3.3

Table III-21: Fish Bearing Streams within the Rogue - Recreation Watershed (Miles)

Stream	Chinook	Coho	Steelhead	Resident Trout
Quartz Creek			2.0	4.5
Birch Creek				2.0
Mill Creek				1.5
Taylor Creek (and tributaries)	1.6	6.6	14.5	17.5

Chinook salmon use the mainstem Rogue River for spawning. In addition, they spawn in lower Galice and Taylor Creeks. Spring chinook salmon begin to enter the Rogue River in March and rest in some of the Rogue River's deeper pools throughout the summer. They are susceptible at this time to *Columnaris*, a disease which is exacerbated by warmer water temperatures.

Coho salmon, steelhead, and cutthroat trout use Rogue River tributaries for spawning and rearing. During the summer the juveniles may leave the smaller tributaries in search of adequate water temperatures and food.

Pacific lamprey (*Lampetra tridentatus*) are anadromous and use Rogue River tributaries for spawning. The juveniles rear in the tributaries until they are ready to migrate to the ocean. Little is known about lampreys in the Rogue Basin, although it is assumed their distribution overlaps with the steelhead.

Reticulate sculpin (*Cottus perplexus*) are one species found throughout the Rogue - Recreation Watershed. Their range overlaps with resident trout.

The redside shiner (*Richardsonius balteatus*) is an exotic specie that flourishes in lower reaches of Rogue tributaries with characteristically higher temperatures, and lower flows than the upstream reaches. In addition, they are found in the backwaters of the mainstem Rogue.

Speckled dace (*Rhinichthys osculus*) are a native fish found within the Rogue - Recreation Watershed. Their range overlaps with resident trout.

The Klamath smallscale sucker (*Catostomus rimiculus*) is the only species of sucker found within the Rogue Basin. They inhabit the mainstem Rogue River and spawn in tributaries in the spring. Little is known about their distribution.

g. Fish Passage Barriers

The following streams have significant barriers to fish passage:

Hog Creek: A 250-foot long culvert under the Merlin-Galice County Road is a barrier to adult and juvenile steelhead and cutthroat trout. The distance required for the fish to travel in conjunction with the

culvert gradient creates a velocity barrier to juvenile and adult steelhead and cutthroat trout.

Stratton Creek: On mainstem Stratton Creek there are two large (6-foot diameter) culverts located on road 35-7-4.2 presenting barriers to juvenile steelhead and cutthroat trout. The furthest downstream culvert lacks an adequate jump pool on the downstream-side. The culvert gradient is also too steep creating a velocity barrier during winter flows. The upper culvert is positioned with a gradient that is too steep for passage during winter flows (velocity barrier). Furthermore, the corrugation within the culverts limits juvenile migration during low summer flows.

Upper Stratton Creek: The 3-foot outflow from a culvert located on road 34-7-22 is directed onto a root wad creating a substantial barrier to adult and juvenile cutthroat trout.

Pickett Creek Tributary: The stream runs through a 50-foot long squash pipe at a 10% gradient. The passageway is a barrier to adult and juvenile cutthroat trout.

North Fork Galice Creek: There are a series of log dams at river mile 0.7 which build up the water level for a mining ditch diversion. The highest drop is four feet and is a migration barrier to adult and juvenile steelhead and cutthroat trout passage.

I. FIRE MANAGEMENT

1. Fundamental Changes to the Natural Fire Regime

The historic fire regime for the watershed has been that of a low-severity regime. This regime is characterized by frequent fires of low intensity. The exclusion of fire occurrence (both natural and prescribed) has lead to a shift in the fire regime to an unnatural, high-severity regime where fires are infrequent, usually high-intensity, and cause stand replacement. Where natural high-severity fire regimes normally occur (*e.g.*, northern Cascades or Olympic Mountains), fire return intervals are long and usually associated with infrequent weather events such as prolonged drought or east wind, low humidity events and lightning ignition sources. Southern Oregon and the Rogue - Recreation Watershed has the same weather conditions and topography that created the former low-severity fire regime. The only change in the fire environment has been the fuel conditions created since the removal of frequent fire. This has caused a vegetation shift to dense, overstocked stands of less fire resistant species, with an increase in dead and down fuels. Simultaneously, a dramatic increase in human ignition sources has occurred. This has created a current condition for large, increasingly destructive, difficult to suppress wildfire with the capability to destroy many of the resource and human values present in the watershed. The Galice Fire in 1987 is an example. This fire burned over 20,000 acres and had nearly 40% high intensity, stand replacement fire. The fire burned for over a month.

2. Quartz Creek OHV Area

Wildfire Risk - The designation of this area for off-highway vehicle (OHV) recreation has the potential to increase the level of wildfire risk within the area. The current view is that risk will not be significantly

changed. The reason is that the project area is currently informally being used for off-highway recreation. The OHV designation has formally recognized an existing human use in the project area. This could have the impact of increasing the amount of use. However, as a designated OHV area, BLM would regulate which areas are used, closing areas that have high hazard, initiate a fire prevention program for OHV use for the area, increase fire protection patrol as the fire danger increases, and close the areas when fire danger reaches critical levels.

The OHV area currently has a high level of wildfire risk. Part of that is a result of the current OHV use. Applying management to that use would reduce a portion of that risk, but an increase in the amount of use could negate that reduction in risk. Therefore, the level of risk was considered to remain at the current level.

3. US Forest Service Lands

Information on current condition in relation to hazard, risk, and values at risk for lands administered by the Forest Service were not available in a format compatible to data collected by the BLM. Therefore, the classifications for those lands are not included for this watershed analysis at this time.

4. Fuel Hazard, Wildfire Ignition Risk, Values at Risk

The data collected for the watershed for hazard, ignition risk, and values at risk for loss from wildfire are summarized in Tables III-22 through III-25. Ratings are displayed on Maps 15 through 19. Rating classification criteria are summarized in Appendix G.

Hazard, risk, and value at risk are conditions that are used to better understand and plan for potential fire management problems and identify opportunities to manage the watershed to meet goals, objectives and desired future conditions. Wildfire occurrence can often prevent the successful achievement of short-term and mid-term land management goals and objectives. Stand replacement wildfire can prevent the development of mature and late-successional forest conditions as well as convert existing mature forests to early seral forests.

Table III-22: Hazard Classification

Ownership (Total Acres: 93,316)	High Hazard	Moderate Hazard	Low Hazard
BLM (37,678 acres)	25,072 (66%)	11,218 (30%)	1,388 (4%)
Private, State, County (25,574 acres)	17,911 (70%)	6,288 (25%)	1,375 (5%)
USFS (30,064 acres)	Na	Na	Na

BLM, Private, State, County (63,252 acres)	**42,983 68%**	**17,506 28%**	**2,763 4%**

Vegetation, dead and down fuel conditions in the watershed for non -USFS lands have only 4% of the area in a low hazard condition and over two-thirds in a high hazard condition. (This does not include the USFS ownership.) The primary factor is the result of exclusion of the nature fire process. Forest management practices that did not treat activity fuels has also contributed to the current condition. However, this would account for less then 29% of the current ratings. Currently, 60% of the watershed is in mid to mature vegetative conditions.

Table III-23: Risk Classification - Acres and Percentage of Ownership

Ownership (Total Acres = 93,316)	High Risk	Moderate Risk	Low Risk
BLM (37,678 acres)	24,998 66%	10,985 29%	1,695 5%
Private, State, County (25,574 acres)	22,627 88%	1,968 8%	979 4%
USFS (30,064 acres)	Na	Na	Na
BLM, Private, State, County (63,252 acres)	**47,625 75%**	**12,953 21%**	**2,674 4%**

Risk is defined as the source of ignition. Human presence and use within the watershed produces high risk for wildfire occurrence.

Table III-24: Value at Risk Classification

Ownership (Total Acres = 93,316)	High Risk	Moderate Risk	Low Risk
BLM (37,678 acres)	17,678 47%	16,233 43%	3,767 10%
Private, State, County (25,574 acres)	13,940 55%	9,537 37%	2,097 8%
USFS (30,064 acres)	na	na	na
BLM, Private, State, County (63,252 acres)	**31,618 50%**	**25,770 41%**	**5,864 9%**

Values at risk are the resource and human values for components of the watershed. The watershed has half of the area in high values. This is due largely to the amount of private lands, especially residential areas,

and the high wildlife, recreational, and other forest resource values found within the watershed, both inside the LSR and elsewhere.

Table III-25: Areas of High Rating in Hazard, Risk, and Value at Risk Classification by Ownership Acreage

Ownership (Total = 93,316 Acres)	Acres with High Rating in All Three Categories
BLM (37,678 ac)	9,161 24 %
Private, State, County (25,574 ac)	8,974 35 %
USFS (30,064 ac)	NA
BLM, Private, State, County (63,252 ac)	**18,135 28%**

The Rogue - Recreation Watershed has nearly one third of the area with a "high" rating in all three factors. The large amounts of lands with high values at risk and the high level of risk of wildfire occurrence demonstrates the urgent need for management actions and activities that will decrease the potential for large stand replacement wildfire occurrence.

J. HUMAN USE

1. Socioeconomic Overview

Current human use of the watershed includes, but is not limited to: tourism, river recreation, harvesting of forest products, mining, ranching, and dispersed recreation.

The primary residents within the watershed include retirees, rural residents that commute between their residence and work in Grants Pass and Merlin, mining claim occupants, and small business owners with businesses related to tourism. The population currently appears to be stable.

The Rogue - Recreation Watershed ranks sixth among watersheds in the Grants Pass Resource Area (RA) in the amount of private land in the rural interface area (RIA). There are 6,354 acres of private land (zoned in 1-5 acre lots and 6-20 acre lots) within one-half mile of BLM-administered land. The BLM manages 6,626 acres within ½ mile of private RIA land in this watershed, which ranks sixth in the resource area (USDI-BLM 1994).

The Rogue River runs north and west dissecting the watershed. The Rogue is a federally-designated National Wild and Scenic River. The town of Galice is located in the north central portion of the watershed. Galice is unincorporated and includes a store/restaurant, rafting businesses and rural

residences. Other rural residential areas within the watershed are along the Riverbanks Road area, north of Wilderville and west of Grants Pass, Lower River Road area, located northwest of Grants Pass and the Pickett Creek area, located northwest of Grants Pass. Scattered residences are also located along Merlin-Galice Road.

2. Recreation

a. Rogue Wild and Scenic River

The Rogue River runs through the watershed and is a main focus for recreation activities such as fishing, boating, and swimming. County parks in the watershed are all located along the river and include: These parks all river access and a variety of other facilities. Hellgate Excursions, a major tourist attraction, provides jetboat river trips originating in Grants Pass, with the longest trip ending at Grave Creek.

Due to the protective measures taken to preserve the recreation resources within the river corridor, the general condition of the river and its riparian confines as well as the surrounding viewshed, are in better shape than a decade ago.

b. Trails/Campgrounds

Existing trails in the watershed are primarily located on Forest Service lands. The Taylor Creek area includes the Taylor Creek Trail, the China Creek Trail and the Burnt Timber Trail. The Tin Can Campground is also located along Taylor Creek Road. Located off Riverbanks Road, the Shan Creek Trail and the Limpy Creek Trail are also on Siskiyou National Forest land.

County park trails include the Umpqua Joe Trail, which takes off from Indian Mary Park, and short trail systems within Whitehorse Park.

The Rainie Falls Trail and Rogue River Trail begin at the northern edge of the watershed and continue into the Farout Watershed. There are many proposed trails on BLM land along the river. Some of these trails include the Stratton Creek Trail (also known as the Robert Dean Trail) and the Buckhorn Mountain Trail. The Forest Service has also proposed a motorized trail system in the Buckhorn Mountain area.

c. Day Use Sites

Day use sites on BLM land include Rainbow Recreation site, Chair Riffle Recreation site and Carpenter's Island Recreation site as well as numerous boat landings in the watershed. These sites generally have toilets, picnic tables and river access.

d. Dispersed Recreation

Dispersed recreation includes off-highway vehicle use, hunting, mountain biking, hiking, equestrian use and driving for pleasure. There are no potential recreation sites listed in the Medford District RMP within the watershed. A portion of the Quartz Creek Off-Highway Vehicle area is located in the northeast part of the watershed. The area consists of 7,160 acres which are designated by the Medford District RMP for OHV use. Approximately 2500 acres are in the watershed, with the rest of the acreage in the Jumpoff Joe Watershed. Use is limited to existing roads and trails. The BLM is currently working with local user groups to map trails and coordinate rehabilitation projects in the area. The Galice Hellgate Back Country Byway passes through the watershed. This nationally-designated driving tour begins in Merlin and continues to Grave Creek and branches off at Galice Creek as well. The byway provides opportunities for exploring the Wild and Scenic Rogue River area by motorized vehicle. There are numerous mining ditches throughout the watershed which could be rehabilitated as trail systems. The Peavine Mountain area also provides opportunities for non-motorized recreation and access to the lookout tower on top of the mountain. Winter recreation opportunities include cross-country skiing on BLM and Forest Service roads in the higher elevations along Taylor Creek and Galice Access Roads.

3. Roads

Some roads in the Rogue - Recreation Watershed have been constructed based on the public's need for access. Many of these roads are on private lands, natural surfaced, lack appropriate drainage structures, and need to be inventoried for potential decommissioning or improvements. The midslope and low elevation natural surfaced roads are a source of erosion and sedimentation into streams. The BLM has no authority over private roads and private land use.

Road construction and improvement across BLM-managed lands were based mainly on timber management as directed under Federal O&C land management. Many natural surfaced roads remained open for administrative access after timber sales were completed. BLM roads are managed and inventoried for potential decommissioning and/or improvements to help reduce sedimentation into neighboring streams.

Prior to 1992 culverts were designed for a 25 to 50-year flood event, or sized based on channel width and stream flow. Culverts designs did not consider native and anadromous fish, concentrated water flow through many of these structures was too great to allow many fish from moving upstream. Scour at the exit of these structures created a pool and over time a drop developed that restricted all movement of fish beyond that point greatly reducing spawning habitat in the stream. Today's culverts are designed for a 100- year flood event, passage of native and anadromous fish to meet the Northwest Forest Plan and the Medford District RMP. During road inventories, existing culverts are evaluated for future replacement to meet the 100-year flood event.

The Rogue - Recreation Watershed varies in road density and type of roads within the drainage area. The average road density across lands other than BLM in the Rogue - Recreation Watershed is 6.49 miles per square mile. The average BLM road density in the Rogue - Recreation Watershed is 3.14 miles per square mile of BLM land. The BLM continues to analyze and inventory BLM-controlled roads in an attempt to

improve the roads and/or reduce road densities to a level appropriate for land management and the environment. Table III-26 shows the miles of road by surface type for BLM and non-BLM roads in the watershed.

Table III-26: Road Information by Surface Type

Road Ownership	Surface Type	Miles	Percent of total
BLM	Natural (NAT)	66.26	15%
BLM	Pit Run Rock (PRR)	28.72	6%
BLM	Grid Rolled Rock (GRR)	23.28	5%
BLM	Aggregate Base Coarse (ABC)	15.20	3%
BLM	Aggregate Surface Coarse (ASC)	23.34	5%
BLM	Bituminous Surface Treatment (BST)	27.97	6%
Private & Other Agencies	Unknown/Various Types (UNK)	259.48	58%
Total Road Miles		**444.25**	

4. Quarries

Few quarries are located within the Rogue - Recreation Watershed. Quarries are located at higher elevations and far from many roads that should be surfaced and maintained.

5. Minerals and Mining

a. Minerals

An inventory, utilizing the mining claim microfiche prepared by the BLM Oregon State Office, revealed that there are several hundred mining claims currently existing within the watershed. There is a fairly even mix of lode claims and placer claims, along with some millsite claims within the watershed. The rights of mining claimants for activities on unpatented claims are outlined in Appendix B.

On the lands administered by the BLM there are three levels of operations that may occur. The lowest level of operations is considered casual use. Casual use operations include those operations that usually result in only negligible disturbance. These types of operations usually involve no use of mechanized earthmoving equipment or explosives, and do not include residential occupancy. No administrative review of these types of operations is required. The number of casual users in this category are not known.

The most common level of operations involve activities above casual use and below a disturbance level of five acres. This level of operations requires the operator to file a mining notice pursuant to the BLM Surface Management Regulations. The mining notice informs the authorized officer of the level of operations that will occur, the type of existing disturbance at the location of the operations, the type of

equipment to be used in the mining operations, and the reclamation plans following the completion of the mining activities.

Mining notices involve an administrative review of access routes used in the mining operations and a review to determine if unnecessary or undue degradation may occur as a result of the mining operations. Approximately one dozen mining notices have been submitted for operations proposed to occur on the BLM-administered lands within the watershed.

A plan of operations may be required for mining operations that meet any of the following criteria:

- Proposed operations that may exceed the disturbance level of five acres;
- Activities above casual use in specially-designated areas such as areas of critical environmental concern (ACEC), lands within an area designated as a Wild or Scenic River, and areas closed to off-highway vehicle use; and
- Activities that are proposed by an operator who, regardless of the level of operations, has been placed in noncompliance for causing unnecessary or undue degradation.

The review of plans of operations involves a NEPA environmental review to be completed no later than 90 days from the date of the submission of the plan. No plans of operations exist within the watershed at this time.

In addition to federal laws mining claimants must comply with state laws where applicable:

-- The State Department of Environmental Quality monitors and permits dredging activities and activities where settling ponds are used.

- The Department of Geology and Mineral Industries (DOGAMI) permits all activities over one acre in size and ensures reclamation is completed in a timely manner. DOGAMI requires reclamation bonds where applicable.
- The Department of State Lands permits instream activities where the removal, or displacement, of 50 cubic yards of material is anticipated and where the movement of a stream channel is planned.
- The Department of Fish and Wildlife (ODFW) monitors turbid discharges from mined sites. ODFW also recommends preferred dredging periods for operations within anadromous fish bearing streams. ODFW also approves variances for operations outside the preferred work periods where applicable.

Dredging within the recreation section of the Rogue River is allowed between June 15 and September 15 annually. Panning is also allowed year round. Both activities may only involve activities below the water surface. Dredges are limited to a four-inch intake. Permits must be acquired by dredgers from DEQ and

the Oregon Department of State Lands.

If mining claim occupancy is proposed by the operator/claimant the use is reviewed by the Authorized Officer. The occupancy must be determined to be reasonably incident to mining and reviewed in a manner similar to a plan of operations. No occupancy may occur until the proposed occupancy is reviewed and written permission is issued by the authorized officer.

b. Surface Uses of a Mining Claim

In some instances the surface of the mining claim is managed by the claimant. These are usually claims that were filed before August 1955 and determined valid at that time. The claimants in these cases have the same rights as outlined above. However, they have the right to eliminate public access across that area where they have surface rights. There are two instances within the watershed where the claimants have surface rights. These rights are outlined in Appendix B.

c. Mineral Potential

Mineral potential is defined in the Medford District RMP (Chapter 3, p. 102) as low, moderate or high (USDI-BLM 1994). The mineral potential maps (Maps 14) show there is a high potential for gold located generally in the area adjacent to the Rogue River downstream from the townsite of Galice and along the lower stretches of Galice Creek. There is a moderate potential for gold west of the townsite of Galice and in the area from Pickett Creek north to the Rogue River.

There is a moderate potential for silver located on the stretch of the Rogue River downstream from the townsite of Galice. The remainder of the watershed has a low potential for minerals. (Note: No information is available on the mineral potential of the lands administered by the Forest Service within the watershed at this time.)

d. Mineral Patent Applications

Within the watershed there are five patent applications pending. Two are located in the upland areas on Mount Peavine, with three located along Galice Creek. If patents are issued those lands involved in the application that meet the validity test would become private land. Those areas that do not meet the validity test would result in the mining claims deemed invalid.

There are mining claim related residences on all five claims where patents have been filed. The disposition of those residences on claims that may be declared invalid will be determined at that time.

e. Physical Condition Resulting from Past Mining Activities

The existing physical condition of all areas within the watershed that have been mined are in various conditions. The areas mined along the Rogue River appear to be in satisfactory condition, however, short-

term visual impacts occur where dredging undermines the shoreline.

Mined areas along Galice Creek have been satisfactorily reclaimed either naturally or by the miners. The area at the location of the Leopold Mine where the hillside was undermined is in poor condition and in need of reclamation. Other locations along Galice Creek are currently being mined with future reclamation planned.

6. Cultural Resources

There are several recorded cultural sites within the watershed. Those areas include prehistoric sites along the Rogue River and historic sites related to homesteading and mining along the river and in the area near Peavine Mountain.

Within the watershed a lot of areas have been surveyed during proposed ground disturbance activities over the years such as timber sales, road construction, and other projects.

7. Lands/Realty

The land pattern of BLM ownership within the watershed is mostly a scattered mosaic. In general, the land patterns have been molded, first by the alternate section pattern of O&C railroad revestment land and, since then, by the transfer of public lands from the United States to various private landowners through several different Congressional Acts. This left the lands owned by the United States and administered by the BLM scattered with access nonexistent in some cases. This also leaves the private landowners with access problems and needs that entail rights-of-way across BLM-administered lands.

Rights-of-way issued to private landowners include roads, water systems, power lines, phone lines, and communication sites. The actual locations of these rights-of-way can be found in Master Title Plats kept updated at the Medford District BLM Office.

There are two occupancy leases within the watershed issued to resolve long-standing occupancy trespasses.

There are filming permits issued periodically along the Rogue River for movie filming.

There are several mineral and land withdrawals within the watershed. The Medford District RMP lists those withdrawals. The most notable withdrawals within the watershed are:

Rogue Wild and Scenic River Corridor - There are two withdrawals at the location of the Rogue River corridor within the Rogue - Recreation Watershed. One withdrawal is the withdrawal that automatically was in place when the Rogue River was designated a wild and scenic river. This withdrawal segregates the lands from entry under most general land laws, but not the mining laws. The other withdrawal that has existed since the late 1950's withdrew all lands within the corridor from mineral entry. However, this withdrawal does not cover an area in the vicinity of Yew Creek that remains open to mineral entry. This withdrawal prohibits the filing of new mining claims within the corridor. However, claims filed prior to

the withdrawal and not abandoned would have prior existing rights. Together both withdrawals preclude the filing of new locatable mining claims and restricts entry under the general land laws.

Galice Creek - This withdrawal, dated April 4, 1995, segregated 290 acres of lands along the lower stretches of Galice Creek for the future development of the Galice Creek Recreation Area. The withdrawal prohibits entry and location under the general land laws, including the mining laws. Location under the general mining laws is prohibited. Mining claims located prior to the withdrawal and kept current have valid existing rights. Claims located within the withdrawal area where mining claim related residences are located are involved in the patenting process. If those claims are determined to be invalid the disposition of the structures would be determined on a case-by-case basis.

7. Illegal Dumping

Illegal dumping occurs throughout the watershed. Some measures such as road gating and blocking have deterred dumping and may be important long-term measures to eliminate this problem. Law enforcement activities can deter dumping if citations are issued with publicity in the local papers.

IV. REFERENCE CONDITION

A. PURPOSE

The purpose of this section is to explain how ecological conditions have changed over time as the result of human influence and natural disturbances, and to develop a reference for comparison with current conditions and with key management plan objectives (*Federal Guide for Watershed Analysis*, Version 2.2, 1995).

B. CLIMATE

The climate of southwestern Oregon has not been static. During the Holocene (the past 10,000 years), shifts in temperature and precipitation affected the type and extent of vegetation, the viability of stream and river flows, fish and animal populations, and human access to higher elevations. Although direct evidence of the past climate and environment is lacking for southwestern Oregon, the broad patterns of climate change experienced throughout the American West can serve as a model. In general, at the beginning of the Holocene, temperatures were rising and the climate was warmer and drier than today. This trend continued until sometime after 6,000 years ago, when wetter and cooler conditions began to appear. During the past few thousand years modern climate patterns and vegetation regimes have prevailed. However, during this period the environmental forces have not been constant. Fluctuating cycles of drier or wetter conditions, varying in duration, characterize the modern climate pattern (Atwood and Grey 1996).

This long period of drier and warmer conditions in southwestern Oregon began to change at some point in the mid-Holocene. The onset of wetter, cooler conditions gradually changed vegetation patterns, as well as the quantity and distribution of game animals and migrating fish (Atwood and Grey 1996).

C. EROSION PROCESSES

Previous to Euro-American settlement there were more mature forests in the Rogue - Recreation Watershed. Vegetation, coarse woody debris, and organic matter on the forest floor protected the soil from erosion (USDI-BLM, Jumpoff Joe WA 1997).

The historical erosion processes are generally the same as those described under the Current Conditions section. Native people probably did not accelerate the rate of movement by their burning practices because they did not burn on very steep slopes. Native burning practices generally involved burning near level to gently sloping areas in valley bottoms, footslopes, and upland meadows. Their fires were spotty and designed to enhance habitats and thus increase numbers of desirable plant and animal species (BLM 1997). The referenced document refers to conditions in southwestern Oregon with specific application in Grave Creek Watershed. A cursory review of General Land Office (GLO) maps with notes that were published in the 1850's and 1991 aerial photos indicate that these types of practices did take place. Frequent burning by the natives at low elevations created park-like forests of scattered trees not typical of the dense forests

we see today (Pullen 1996)

Concentrated flow (gully and rill) erosion occurred mainly in draws where channels were created. The density of these channels varied with climatic cycles. During wetter cycles the intermittent stream channels were more common. During dry cycles, cobbles, gravel, and plant debris accumulated in the draws, burying the channel. According to Pullen, 1996, the natives recognized the value of riparian areas for humans and animals and, therefore, did not burn within them. Furthermore, the riparian areas of Class I, II, III and sometimes IV streams are very moist due to the stream influence and would not burn as easily as the uplands.

Mass movement or slides may have occurred in the areas of Manita and other deep, fine textured soils. Mass movements also occur in Dubakella soils which is moderately deep but found over serpentine and as a result often slides. Acceleration of mass movement can be caused by a reduction of root strength and/or an increase in moisture content, a result of decreased transpiration. It is doubtful native people's land management practices affected the rates of mass movement. The native people's burning practices had it's greatest effect on shallow rooted plants that rapidly regenerated. Plants with the greatest root strength at depth were negligibly affected by burning.

Native peoples had foot trails instead of roads. These narrow foot trails had very little effect on erosion, water quality, and water quantity. In the 1850's, with the settlement of the area for mining and later farming, trails and wagon roads were beginning to be constructed. With increased roads came increased erosion from ditchline erosion and cutbank and fill failures. In the early 1900's a seventeen ton machine known as "The Beast" was used to haul lumber over roads; it damaged both bridges and culverts (Booth 1984) and compacted the soils considerably.

D. HYDROLOGY

1. Floods

Periodic flooding within the Rogue River basin has had devastating consequences on the cultural environment. River flows were high enough during these major flood years to destroy bridges, roads, buildings, and mining structures, and to inundate agricultural lands and stream courses. No written record exists of flood impact on human improvements, soil vegetation, or aquatic life before Euro-American settlement and development, although certainly catastrophic 100-year floods occurred then, as in the recent past (Atwood and Grey 1996).

Warm rain on snow events have occurred throughout the Euro-American history of the Rogue River and its tributaries. These events have resulted in increased flooding those years (Hill 1980). In an article in the Rogue River Courier, January 29, 1903, it was written that since Euro-American settlement in the Rogue River area in the 1850's, there had been floods in 1853, 1861/1862, 1866, 1881 and 1890. All of these except for the flood of 1890, which was a rain event, were caused by rain on snow events. Warm rain on snow events have historically been a large factor in flooding in the Rogue - Recreation Watershed. The flood of December 1861 was the largest flood on record on the Rogue River. In that year, severe

flooding inundated fields, destroyed improvements, and destroyed crops along the river. Property at the mouth of Limpy Creek in the Rogue - Recreation Watershed was covered with six inches to two feet of sediment. In one spot along the river, about 30 acres was covered with driftwood ten to fifteen feet high. All dams on Galice Creek were swept away and the Rogue River near Galice was 45-50 feet above the low water mark (Oregon Sentinel, December 21, 1861).

Major floods of record in the 1900's occurred in 1927, 1955, 1964 and 1974. (Atwood and Grey 1996). Another major flood occurred in 1997. In the flood of 1927, the Rogue River was swept clear of every bridge between Grants Pass and the Pacific Ocean (Rogue River Courier, March 4, 1927).

2. Droughts

Drought conditions were noted in 1841, 1864, 1869-74, 1882-85, 1889, 1892, 1902, 1905, 1910, 1914-17, 1928-35, 1946-47, 1949, 1959, 1967-68, 1985-88, 1990-92, and 1994 (LaLande 1995). During the drought years, many of the smaller streams in the area went dry and the larger streams had low flow.

3. Dams

Beaver dams were prevalent on the Rogue River system before Euro-American influence. Between 1827 and 1850, fur traders removed virtually all of the beaver from the Rogue River valley (Atwood and Gray 1996). Consequently the dams were no longer maintained and were destroyed over time. Beaver dams added woody material to streams, trapped and stored fine sediments, and reduced water velocities. The loss of beaver dams likely resulted in scouring of channel beds and banks, increased width/depth ratios, and fine sediment deposition in pools (USDI-BLM, Applegate Star-Boaz WA 1997).

There have been manmade dams on the Rogue River upstream of the Rogue - Recreation Watershed for nearly 100 years. Ament Dam was built in the early 1900's at Pierce Riffle on the Rogue River for mining and irrigation. In 1919, Ament Dam was removed and replaced with Savage Rapids Dam in 1921 (Sutton 1966). This dam, along with the Lost Creek Dam have severely altered the natural flow regime of the river which is winter flooding and summer droughts. However, the effect of the dams on the Rogue River in the Rogue - Recreation Watershed has been limited because of the long distance downstream from the dams.

Tributaries to the Rogue River in the Rogue - Recreation Watershed have had dams on them as well. Galice Creek has had dams on it since the mid-1800's (Oregon Sentinel, December 21, 1961).

4. Mining Effects

Mining began in Galice Creek in the 1850's and Galice Creek was a principal mining area of the county during that decade (Hill 1976). In 1860, a quartz vein was discovered on North Fork Galice Creek (Hill 1976). The mammoth and yank ledges were discovered in 1874 in the Rogue River three miles below the mouth of Galice Creek. They were 200-feet thick and extended across the bed of the Rogue River. In less than one month, 200 claims were taken out on these veins (GP Bulletin, January 29, 1937). Hydraulic

"giants" used in mining were a familiar sight in the area during that time. In fact, the old channel placer mine near Galice has been referred to as one of the largest hydraulic operations in the United States (Hill 1976). Hydraulic mining results in increased entrenchment, lower sinuosity, and increased sediment loads that fill pools with fine sediment (USDI-BLM, Applegate Star-Boaz WA 1997).

E. STREAM CHANNEL

Prior to Euro-American settlement, the steep, headwater streams in the Rogue - Recreation Watershed had adequate amounts of coarse woody debris to create a step/pool profile. Forests along the streams provided shade and an abundant source of coarse woody debris resulting from tree mortality. The coarse woody debris provides both structure and nutrients for the stream. Commonly the lower reaches of the tributaries to the Rogue River within the Rogue - Recreation Watershed were more sinuous than they are today. Therefore, the streams were longer, more complex, and had more aquatic habitat available. This is especially true in types of areas later used for mining and agriculture. Decreased sinuosity from mining and agriculture has resulted in decreased surface area of the streams allowing for decreased groundwater recharge.

F. WATER QUALITY

Overall, prior to Euro-American settlement, historic summer water temperatures were likely lower than today due to lower width/depth ratios and more riparian vegetation. Given the fire occurrence prior to 1920 some stream reaches could have been sparsely vegetated for periods of time, resulting in higher water temperatures during that time (USDI-BLM 1997).

Agriculture and mining in the late 1800's and 1900's resulted in a reduction in riparian vegetation allowing more solar radiation to reach the streams. Increased water temperatures resulted from this activity. Irrigation withdrawals lowered stream flows and increased the surface area of the water receiving solar radiation. This also increases stream temperatures.

Sediment loads and turbidity levels were historically lower due to fewer sediment sources prior to Euro-American influences. Sedimentation and turbidity rose dramatically in conjunction with hydraulic mining, land clearing, road building, and settlement along creeks and rivers.

G. VEGETATION

Historical vegetation patterns or reference condition alludes to the forests or vegetation that existed on a site prior to significant Euro-American modification. Examples of significant Euro-American modification include clearing for settlement and agriculture, human development (homes, buildings, roads, etc.), timber harvesting, mining, grazing, and fire suppression.

The information gathered is from the O&C revestment notes. The inventories were done to determine the economic worth of the land at that time, how much timber volume was present, and how the land should be used. Every 40-acre parcel of O&C land was surveyed. Although some of the notes were hard to

interpret, some conclusions can be drawn of what the general landscape looked liked circa 1920.

Enough information is present in the old surveys to develop an approximate major plant series map. The information in the survey notes described the conifers present in both the overstory and understory, the amount of board feet present at that time, the major hardwood species (madrone, oak, etc.), the dominant brush species such as *Ceanothus* or manzanita, and whether or not there were any recent signs of fire events.

Historic information was taken from the available data on the majority of BLM lands. The reference conditions of Forest Service land were similar to that of the BLM lands.

The data shown below summarizes the historic major plant series within the Rogue - Recreation Watershed. This is shown to give an idea of past vegetation in the Rogue - Recreation Watershed and does not represent exact acreage totals by series, mature/late-successional habitat, or for fire events. The board foot per acre totals are broken out showing percent of the Rogue - Recreation Watershed with equal to or greater than 10,000 thousand board feet per acre. This is done for two reasons: 1) to show the amount of "high volume" acres in the Rogue - Recreation Watershed in 1920 and 2) to give an estimate of suitable habitat for late-successional dependent species. Ten thousand board feet per acre will be considered the low end for this type of habitat. Cruise data from the 1920 notes are based on different methods and standards. The yield is a conservative estimate by today's standards (Harris 1984).

Table IV-1: Historic Major Plant Series within the Rogue - Recreation Watershed (1920)

Major Plant Series	No. Acres Surveyed	Percent Acres Surveyed	Estimated Acres Burned	Percent BLM Acres Burned by Series	Estimated Acres of Late-Successional Forest	Percent by Series for Lands Surveyed
Douglas-fir	11,880	57%	1,200	10%	1,240	10%
Jeffrey Pine*	40	0%	0	0%	0	0%
Non-Timber	2,640	13%	800	30%	0	0%
Ponderosa Pine	5,240	25%	440	8%	40	1%
White Oak	1,000	5%	280	28%	0	0%
Total	**20,800**		**2,720**		**1,280**	

* Due to the unique nature of Jeffrey pine sites, the true acre figures for this series are considered to be lower than what truly exists. These sites may be represented in the revestment notes as non-timber or ponderosa pine. The 1997 inventory is a more accurate representation of the amount of land with the Jeffrey pine series present.

Major plant series is an aggregation of plant associations with the same climax species dominant(s). The Jeffrey pine series, for example, consists of plant associations in which Jeffrey pine is the climax dominant. It defines the potential natural vegetation that would exist on the site at the climax stage of plant succession, or the end point of succession where neither the plant composition nor stand structure changes.

1. Landscape Patterns

Several landscape patterns are apparent from a comparison of historical data with current vegetation conditions:

a) Fire events primarily took place at low elevations, midslopes and warmer aspects in the northeast and southeast portions of the watershed.

b) A majority of the ponderosa pine series is in the areas that are low elevation. These areas are now farm lands or in existing rural developments. These sites occurred primarily in the southeast portion of the watershed.

c) The Douglas-fir series occurs primarily in the Rogue-Galice, Taylor Creek and Lower Rogue-Recreation Section subwatersheds and at mid and upper elevations in the watershed.

d) The Jeffrey pine series is situated in the southern half of the Rogue - Recreation Watershed. This series is commonly found on southerly aspects at midslopes where the parent material is serpentine.

e) Plant series with infrequent high-intensity fires has a much higher `percentage of mature/late-successional structure than those with a shorter fire return interval.

f) Revestment notes indicate tanoak occurred less frequently on BLM- administered land than is found in the watershed today. This may indicate an inventory omission of this easily detected species or correlate to a boost in species abundance resulting from of 70 years of successful fire suppression.

H. SPECIES AND HABITATS

1. Terrestrial

a. Special Status Plants

It can be postulated that the habitat for late-successional special status species (the *Cypripedium* sps. and *Allotropa virgata)* was once more extensive in the watershed before timber harvest was common. Even though larger condition classes do exist in the watershed today, it is impossible to know which pre-settlement habitats harbored orchid populations and how extensive they were in the past. The micro-habitat required was most likely more abundant and contiguous with frequent, low-intensity fires helping to maintain a competitive edge for these species in the herbaceous layer. Due to the complex life history of these plants, they were probably never a dominant species in the herbaceous layer, but they could have occurred more frequently in the watershed and with higher numbers of plants per population area if moister, shaded microsite conditions occurred more frequently.

Since serpentine habitats occur because of unusual soils their area was probably similar to and contained the same type of plants as today, but at higher levels of diversity. The low intensity, more frequent fires of the past probably helped to promote this higher species diversity. These areas were also probably more extensive in size because the fires prevented encroachment from trees and shrubs. There was probably a higher prevalence of *Camassia howellii* and *Microseris howellii.*

More openings in shrublands or chaparral probably existed since fire frequencies were higher due to lack of suppression. This would mean that such species as *Eschscholzia caespitosa* and *Delphinium nudicaule* may have been more common than currently known. Other openings created by fire in forested habitats, especially on serpentine-influenced soils, most likely created a natural patchiness of *Sophora leachiana* populations across the landscape. This is in direct contrast to the clustered, linear distribution currently found along disturbed corridors.

The serpentine rock outcrops that are habitat for *Sedum moranii, Arabis modesta* and *Lewisia cotyledon var. howellii* were probably of the same extent in past time on BLM land. The outcrops may have been more pristine (untouched) before the introduction of off-highway vehicles and rock quarrying in certain areas of the watershed. Data is not available for private lands in the watershed where removal of rock outcrops may have occurred.

Noxious weeds were nonexistent before the advent of European settlers. Purple loosestrife would not have been a problem so native vegetation would have been more intact along the banks of the Rogue River.

2. Aquatic

a. Fisheries

Pre-Euro-American Settlement: A pre-Euro-American depiction of the Rogue - Recreation Watershed would include robust populations of beaver and salmon, particularly in the lower reaches of Taylor, Pickett, Limpy, Dutcher and Galice Creeks. In addition there was a mixture of mature conifer and hardwood Riparian Reserves with dense canopies. Summer water temperatures were probably cool and not a limiting factor in salmonid production. There was large woody debris dispersed throughout the streams providing complex habitats for juvenile cutthroat trout, steelhead and salmon. There probably was an abundance of fish in most streams. Native Americans relied heavily on salmon, steelhead, lamprey and suckers for subsistence and ceremonial purposes.

Prior to Euro-American settlement, streams meandered with unconstrained channels. Multiple stream channels dissipated flows and created fish habitat. Riparian vegetation and trees up took heavy winter rains, limiting effects from annual peak flows. Winter scour did not limit macroinvertebrate and fish populations. In addition, large riparian downed wood held back spawning gravels in flashy systems such as Galice Creek. Sediment within the spawning gravels was not limiting to fish or macroinvertebrate populations. Occasionally, landslides would deliver sediment to streams. However, large wood almost always accompanied the sediment delivery. The wood controlled sediment movement throughout the system and spawning gravels were not embedded with sediment.

Post-Euro-American Settlement: Euro-Americans trapped beaver extensively and as a result complex, deep pools started disappearing throughout the watershed. Coho salmon populations began declining. In addition, mining roads and other travel ways began increasing in abundance. This led to an increase in peak winter flows, especially when the roads were located near the streams. Sedimentation of streams increased as a result. Hydraulic mining operations began to peak from 1890-1910, and decreased slowly until 1930. Hydraulic mining caused extensive erosion of the streambanks. Extensive mining in the early 1900's caused the Rogue River to run brick red with silt (ODFW 1994). Large hydraulic mines were found in Pickett, Galice and Taylor Creeks. Further stream sedimentation began to decrease salmonid populations.

There was limited agricultural activity within the Rogue - Recreation Watershed Analysis area, however irrigation diversions limited salmonid survival wherever it occurred.

Timber harvest had one of the biggest impacts on juvenile coho salmon, steelhead, and cutthroat trout habitat. Large trees that grew next to the stream were harvested due to their valuable size. When the majority of the large wood was removed, there was minimal remaining recruitment for fish habitat. Habitat complexity rapidly declined, as did the coho salmon, steelhead, and cutthroat trout populations dependant upon the large wood. Coho salmon were most affected by the loss of large wood, since juvenile coho require pools for habitat. In addition, coho are not found as far up stream as cutthroat trout or steelhead. As a result, when the habitat was removed, they had no refugia.

Road construction increased with timber harvest and this compounded the problem of limited juvenile habitat. Sedimentation increased, and began limiting salmonid production. Winter flows began to have higher peaks as a result of the increased surface areas of roads. High winter scour limited macroinvertebrate populations, and transported wood from streams. Fish habitat declined. In addition, many roads were constructed next to streams. This eliminated stream meander and multiple channels. Peak flows did further damage as, the stream could not naturally diffuse the high energy.

Commercial salmon harvest impacted the declining salmon runs further. Insufficient restrictions on commercial harvest, coupled with a rapid decrease in freshwater habitat, led to a crash in the coho salmon population.

3. Wildlife

A pre-Euro-American depiction of the Rogue - Recreation Watershed would be dramatically different than one would see today. Native Americans were managing the landscape for habitats and products they found useful. Fires were used to burn off undesirable vegetation, and to promote growth of desired products. Wildlife was extensively used by these people to meet their everyday needs. Human exploitations of these wildlife resources were at a sustainable level. Each species maintained its role in an intricate food chain, where their presence benefitted the community as a whole. Large predator species such as grizzly bear, and wolves *(Canis lupus)* were present in the watershed (Bailey 1936) and, along with cougar *(Felis concolor)* and black bear *(Ursus americanus)* maintained the balance of species such as Roosevelt elk *(Cervus elaphus)* and blacktailed deer *(Odocoileus hemionus)*. Predator species kept herbivorous species

in balance with vegetation. Predator species also benefitted other community members such as ground nesting birds. They harvested small mammals such as raccoons *(Procyon lotor)* that fed on the young birds. Predators also made carcasses available in the winter that benefit species as diverse as the striped skunk *(Mephitis mephitis)* and the black-capped chickadee *(Parus atricapillus)*.

The landscape was open and the movement of animals was unrestricted. Many animals would migrate with the seasons to take advantage of food, shelter and water. Black bears in the early spring sought green grass to activate their digestive system. Winter kills that remained were utilized by the bears at this time. During early summer California ground-cone *(Boschniakia spp.)* became an important part of their diet, until berries were available. As fall approached, the salmon returned to the river, spawned and died. This abundant food source was available to a host of consumers and scavengers. Deer and elk also followed the seasons. Winter was primarily spent in the oak/savannahs. As the seasons progressed they would enter the uplands, until fall arrived. Other species such as the wolverine *(Gulo gulo luteus)* remained at high elevation throughout the year. This species was an opportunistic predator, feeding on animals such as porcupines *(Erithizon dorsatum)* and occasional winter kills.

Historically, the valley floor was dominated by an open stand of large conifers and oak grasslands kept free of brush due to fire. Maps produced in 1856 through 1894 by the General Land Office characterize this area as "surface hilly with open Pine, Fir, Cedar and Oak timber." This habitat provided nesting areas for various species, mast crops of acorns for wildlife forage, and big game winter range. A variety of bird species such as the acorn woodpecker *(Melanerpes formicivorus)*, western blue birds *(Sialia mexicana)* and Lewis' woodpeckers *(Melanerpes lewis)* were intricately tied to these stands. Species such as the sharptailed snake *(Contia tenuis)*, the common kingsnake *(Lampropeltis getulus)*, and the mountain kingsnake *(Lampropeltis zonata)* used the grassland-riparian interface area as their primary habitat. The open condition, and the grass were highly beneficial to a number of game animals, and ground nesting birds. Deer and elk used this area for winter range. In turn, game animals provided sustenance for a host of predators species. Grey foxes *(Urocyon cinereoargenteus)* used the valley, and nearby brushy slopes as their primary habitat.

The area found above the valley floor was dominated by conifers. Stages of stand development varied due to disturbance events such as fire. Forests found on north and east facing slopes were generally multi-canopied, with large amounts of snags, down wood, and large trees. South and west facing aspects were composed of stands with a higher fire return interval, and were often devoid of large amounts of down woody material. The amount of old-growth forest historically found in the watershed varied through time in response to disturbance events. Old-growth/mature forest was the dominant forest type in southwestern Oregon prior to Euro-American settlement, ranging as high as 71% (Ripple 1994).

Species that benefitted from these forests such as the pileated woodpeckers *(Dryocopus pileatus)*, northern flying squirrels *(Glaucomys sabrinus)* and red tree voles *(Phenacomys longicaudus)* were found in greater numbers than they are now. Dispersal of animals, recolonization of former habitats, and pioneering into unoccupied territories, was accomplished more effectively than it is today due to the connectivity of the older forest. Ripple (1994) estimated that 89% of the forest in the large-size class was in one large connected patch extending throughout most of western Oregon. Due to the connectiveness of mature

habitat, species that benefitted from edge environments, like striped skunks *(Mephitis mephitis),* were less common than they are today.

Snags were more numerous than they are today and species that use snags for their primary habitat were more common. Numerous disturbance events such as fire, windthrow, and insect infestations played an important role in snag production. Due to the increased habitat, species that use snags were more common than they are today. Species such as the northern pygmy owl *(Glaucidium gnoma)*, western screech owl *(Otus asio),* and northern flicker *(Colaptes auratus)* had more habitat than what is currently available.

4. Riparian

Prior to the settlement of the valley, pristine streams flowed from their source to the Rogue River. Water quality was extremely high. Seeps, springs, snow and riparian vegetation all contributed to keeping the water cool. During the winter and spring occasional floods would flush the system clear of sediment deposited from natural slides and erosion. Stream courses in uplands were primarily lined by conifers with a narrow band of deciduous trees and were well defined by entrenched channels. As the stream dropped to the valley floor, wide floodplains were developed and the streams begin to meander taking on a variety of courses from year to year. These highly sinuous stream systems consisted of undercut banks, oxbows, and woody material that created a diverse aquatic system and associated habitats. Here, the riparian zone would have widened, with deciduous trees playing a more important role than they did in the uplands. Due to higher humidity, conifers near the streams resisted burning, allowing them to mature, resulting in heavy loading of large woody debris in the water. Adding to the diversity was a myriad of wildlife species. Beavers *(Castor canadensis*) acted as a keystone species, creating backwater sloughs behind their dams, and adding finer woody material to the stream. This fine material benefitted fish, providing them with cover. Species such as ducks and geese also benefitted from the creation of ponds that provide nesting habitat. The diversity of wildlife species was not restricted to the surface as a profusion of aquatic insects took advantage of the variety of available niches. These insects in turn supported an assortment of vertebrate species including anadromous fish. As the adult fish returned to their native streams, their carcasses would produce a rich source of food that, in turn, supported minks *(Mustela vision)*, American black bears *(Ursus americanus)*, grizzly bears, bald eagles *(Haliaeetus leucocephalus)* and a number of other scavenger species.

I. FIRE

The historical fire regime of the Rogue - Recreation Watershed was dominated by a low-severity regime. The low-severity fire regime is characterized by frequent (1-25 years) fires of low intensity (Agee 1990).

Fires in a low-severity regime are associated with ecosystem stability, as the system is more stable in the presence of fire than in its absence (Agee 1990). Frequent, low-severity fires keep sites open so that they are less likely to burn intensely even under severe fire weather. Limited overstory mortality occurs. The majority of the dominant overstory trees are adapted to resist low-intensity fires because of thick bark developed at an early age. Structural effects of these fires are on the smaller understory trees and shrubs.

These are periodically removed or thinned by the low-intensity fire along with down woody fuels. The understory density was low, open, and "park like" in appearance.

With the advent of fire exclusion, the pattern of frequent low-intensity fire ended. Dead and down fuel and understory vegetation are no longer periodically removed. Species composition changes and thinner bark, less fire resistant species increase in numbers and site occupancy. This creates a trend toward an ever increasing buildup in the amounts of live and dead fuel. The understory of stands becomes dense and "choked" with conifer and hardwood reproduction. The longer interval between fire occurrence allows both live and dead fuel to build up. This creates higher intensity, stand replacement fires rather than the historical low-intensity ground fire that maintained stands.

1. Social Concern - Air Quality

Poor air quality due to natural and prescribed (human) fire has been a historical occurrence in the spring, summer, and fall seasons for southern Oregon. Numerous references are made by early Euro-American explorers and settlers to Native American burning and wildfire occurrence in southern Oregon. Smoke-filled sky and valleys were once typical during the warm seasons. Air quality impacts from natural and prescribed fire declined with active fire suppression and the decline in settlement and mining burning. Factors influencing air quality shifted away from wildfire and human burning to fossil fuel combustion as population and industry grew. This created a shift in the season of air quality concern to the winter months when stable air and poor ventilation occurs. By the 1970's, fossil fuel emissions became the major factor along with wood stove and "backyard" burning. Prescribed burning related to the forest industry increased throughout this period and was an additional factor, particularly in the fall season. Regulation of prescribed burning smoke emissions and environmental regulation of fossil fuel combustion sources has lead to a steady improvement in air quality since the 1970's.

Air quality as a reference condition is determined by legal statutes. The Clean Air Act and the Oregon State Air Quality Implementation Plan have set goals and objectives. Management actions must conform so that effort is made to meet National Ambient Air Quality Standards, Prevention of Significant Deterioration, and the Oregon Visibility Protection Plan and Smoke Management Plan goals.

2. Social Concern - Hazardous Fuels Build-Up

The reference condition for fuel conditions in a pre-settlement period would have been one of low build-up over the vast majority of areas. Lack of fire suppression and Native America use of fire maintained a comparatively open forest understory with little fuel accumulation or understory vegetation growth. This would have occurred across the watershed with only isolated areas of dense undergrowth and fuel accumulation. These areas would change over time. Location would largely be dependent on lightning occurrence pattern, with the exception of areas used by Native Americas for food production. The build-up of fuel and vegetation changes that have resulted from modern human settlement and subsequent fire exclusion currently create a hazardous situation that is outside of the reference condition and natural range of variation.

J. HUMAN USES

1. Cultural/Historical Use

Archeological evidence indicates that human occupation of southwest Oregon dates back about 10,000 years. During these prehistoric times the native inhabitants occupied southwest Oregon and minimally impacted the physical landscapes. The native inhabitants of the area are generalized as hunters and gatherers.

The first known whites to enter the Rogue Valley passed through in early 1827. They belonged to a party of Hudson's Bay Company trappers from Fort Vancouver under the leadership of Peter Skene Ogden. The Hudson Bay Company trappers continued to visit the area for several years. Other trappers and explorers made periodic visits to the area up to the time of the discovery of gold in Jackson County.

Gold was discovered on Jackson Creek (near present day Jacksonville) in the Rogue Valley in late 1851, or early 1852. Although gold was previously discovered elsewhere along the Applegate and Illinois Rivers, this gold discovery brought an influx of thousands of miners to the region.

As mentioned in the Characterization section, the land ownership pattern of the watershed was primarily molded in the late 1800's and early 1900's. The lands in the watershed in the mid-1800's were public lands owned by the United States and administered by the General Land Office. The first primary transfer of public lands out of ownership by the United States was to the State of Oregon following statehood in 1842.

In order to further develop the west, Congress passed several laws enabling settlers to develop and obtain ownership of the public lands. These laws included Donation Land Claim patents, entry under the Homestead Acts, military patents, and mineral patents. In addition to these types of deeds, land was deeded to the Oregon and California Railroad, with some of those lands being sold to private individuals. In reviewing the master title plats for the Rogue - Recreation Watershed, it is apparent that ownerships of several of the low elevation lands were originally deeded from the United States to private individuals through the above Acts of Congress.

Gold mining began within the watershed in the late 1800's. The majority of the mining appears to have been placer mining, however, however there have been several lode (hard rock) mines in operation within the watershed.

Extensive hydraulic mining can be seen along the Rogue River and its tributaries. Tailing piles from past mining can also be seen along Galice Creek.

The townsite of Galice was established in the early 1850's. The town was named for Louis Galice, a French placer miner who first prospected the creek now bearing his name. The town of Galice was an important center for the region's mining population. The Galice Store, succeeded by the Barlow Store, sold food and goods to the miners and packers.

The abrupt influx of miners into the Rogue country devastated local Indian bands. Miners were ruthless in their treatment of the Indians. The mining destroyed the river banks and way of life of the Indians. Clashes between the United States government and volunteer forces occurred between 1851 and 1856. By the spring of 1856 the Indians were defeated with those remaining taken to reservations elsewhere.

The Alameda Mining Company was formed near the end of the century. The site became one of the most extensively developed mining sites in southwestern Oregon. The mine consisted of six levels above the river and a shaft that ran 450 feet below the river. The mine was worked continuously until 1916 when operations were suspended. The mine has been operating periodically since.

Mining occurred at several locations just west of Galice in the old river channel formations. The most successful mine was know as the Old Channel Mine. Mining began there in 1860 when the first high ditch was built. Hydraulic cuts up to 100 feet in height are still evident today.

The Flanagan Mine was located approximately one mile upstream from Robertson Bridge. The mine was hydraulically worked. Evidence of several cut faces remain, as do mining tailing piles.

Another long active mine was located across from the Rand townsite. This mine was established in 1900. The mine in 1910 consisted of three-quarter miles of ditches, a reservoir, a hydraulic giant and pipes, and two cabins. By 1940 the mine had over four miles of ditches, 2,000 feet of 11-inch to 20-inch pipe, and four hydraulic giants in operation.

Agriculture was, and still is, very evident along the stretch of the Rogue River between the mouth of the Applegate River and Pickett Creek. There are several farms noted and ranching occurring in places. One large farm/ranch is located near the mouth of the Applegate River and referred to as the mint farm.

The Wild and Scenic Rivers Act of 1968 was the first legislative action to preserve free-flowing rivers in their natural state, preserving their outstandingly remarkable values for generations to come. The Rogue was one of the first eight rivers to be included in the 1968 legislation. Eighty-four miles of the Rogue were designated within the language of the original act. Forty-seven miles of the Rogue are included within this watershed from the mouth of the Applegate River to Grave Creek.

The Wild and Scenic Rivers Act allowed for three different classifications for river stretches. The classifications are: wild (little or no shoreline development and essentially primitive), scenic (some development visible but not dominant) and recreation (maximum shoreline development). The section within the Rogue - Recreation Watershed is classified as recreation.

Within the legislative language are mechanisms that may be used to protect the outstandingly remarkable values for which the river is designated. Two major tools are scenic deed acquisition and scenic easement acquisition.

Scenic deed acquisition is the outright purchase of shoreline lands within the corridor (one-half mile wide) to insure that no further development occurs. Scenic easement acquisition is the negotiated purchase of

a deed restriction on private lands that limits future development of the lands and restricts certain activities. Both tools are meant to retain the visual character of the river as it was at the time the easement was acquired.

The BLM has assumed an active management role on this 47-mile stretch. The Rogue River Program was established by the BLM in 1970 to initiate the protective measures referenced above and to manage recreation use on the river both public and private.

The administrative center for the "river program" is the Rand Visitor Center and its associated ensemble of site facilities. Rand is a National Historic Register Site and was previously the headquarters of the Galice Ranger District of the Siskiyou National Forest. The BLM acquired the site through a land exchange that had occurred some years earlier.

2. Roads

Before settlement of the west, ground disturbances were caused by animal trails and forces of nature. As the west developed, trails became narrow roads used to transport people and supplies. These roads were generally natural surface with the amount of sediment flow dependent upon use, location, weather conditions, and soil type. As the use of these roads increased over the years, the roads themselves changed in design. Many of today's highways began as trails and are now widened, realigned, and surfaced to meet the increase and change in vehicle traffic. Even with the increase in traffic flow, crushed rock surfacing, asphalt, modern techniques in road stabilization, and improved road drainage have actually decreased sedimentation and erosion along the original natural surfaced roads.

3. Recreation

Historically, recreation activities centered around the Rogue River. Activities included fishing, swimming and boating. Fishing in the Rogue River has undergone startling changes in the last seventy years. Rowboats for pleasure, or incidental fishing were practically unknown in those older days. (Booth 1984)

Developments in recreation equipment technology have allowed recreationists to enjoy the river year round and in relative comfort. Motorized and nonmotorized craft have elevated recreational fishing and boating to the levels seen today.

During the earliest years of the 20th century, recreational activity was intertwined with work and food acquisition. (Atwood and Grey 1995). The 1930's brought about the Civilian Conservation Corps (CCC), which, along with other duties, was responsible for building roads. These new roads provided recreation opportunities that were not previously accessible to many people. People began using roads to access sites for hiking, camping and driving for pleasure. In 1935, a suspension bridge was built by the CCC across Grave Creek. When completed, it opened up a new scenic loop for sightseers. Going by way of Merlin to Galice and on down the Rogue, motorists were able to cross the bridge and return to the Pacific Highway via the Grave Creek road. (Hill 1979) Other recreational activities included camping, hunting and horseback riding.

V. SYNTHESIS AND INTERPRETATION

A. PURPOSE

The purpose of synthesis and interpretation is to compare existing and reference conditions of specific ecosystem elements, to explain significant differences, similarities or trends and their causes, and to identify the capability of the system to achieve key management plan objectives.

B. EROSION PROCESSES

The major changes between historical reference conditions and current conditions are due to an increase in intensity and type of human interaction with the environment. Native people's burning practices were limited to valley bottoms, gently sloping footslopes, and isolated upland meadows. The fires were spotty. This contrasts strongly with forest management that has occurred since the turn of the century.

Both on private and public lands, intensive forest management has included fire suppression, extensive road construction, and logging with yarders on steep slopes and tractors on gentle to moderate rate slopes. Fire suppression has resulted in accumulation of fuels. The Galice fire of 1987 burned over 20,000 acres and was nearly 40% a high intensity, stand replacement fire (see Fuels section, Chapter 3). A high-intensity fire consumes the duff, litter and most of the coarse woody debris. The top layer of mineral soil impacted by a high-intensity fire commonly shows color changes due to consumption of organic matter and effects of heat on the mineral components.

The cumulative effects analyses of roads completed on small watersheds within the Rogue - Recreation Watershed showed that five of seven had road densities greater than 4.0 miles per section.

Other sites, including the Peavine area in the central and west portions of the Late-Successional Reserve appear to have high road density. High road densities combined with patch clearcuts such as have been done in the past in these small watersheds result in substantial increases in peak flow (Jones 1996). Other effects that may be attributable to high road densities combined with clearcuts are a destabilization of stream channels and a reduction in the intermediate and low flows.

Mining particularly in North Fork of Galice Creek has affected erosion processes. Heavy disturbance coupled with diversion of surface flow has created increases in susceptibility to mass movements (slides) and bank erosion. In 1997 a slide occurred where a miner had heavily disturbed a slope with a bulldozer. The runoff from the slide overwhelmed the sediment trapping pond and poured very turbid water into North Fork of Galice Creek.

C. HYDROLOGY

The stream flow regime in the Rogue - Recreation Watershed reflects human influences that have occurred since European settlers arrived (USDI-BLM 1997). Potential changes may include channel widening, bank

erosion, channel scouring and increased sediment loads.

Road construction, timber harvest and fire suppression are the major factors having the potential to adversely affect the timing and magnitude of stream flows in portions of the Rogue - Recreation Watershed. Extensive road building and timber harvest have raised the potential for increasing the magnitude and frequency of peak flows in many tributaries. The magnitude of the effect on the Rogue River is small but part of a cumulative effect that includes all the upstream basin. As vegetation in the harvested areas recovers, the increases in magnitude and frequency of peak flows will diminish. Permanent road systems will not allow the stream flow to return to pre-disturbance levels (USDI-BLM 1997).

Roads adjacent to streams particularly have a direct effect on stream flow patterns and water quality. There are several roads built in the watershed in the past and which were located where the natural gradients made road location and construction easiest, generally in canyon bottoms where streams were located. This process, coupled with subsequent investments for improvements and the addition of tributary roads have made these roads nearly permanent. Examples of such roads are the Galice Creek and North Fork of Galice Creek Roads, Stratton and Lower Stratton Roads and the Picket Creek Road. Several years ago Oregon Department of Transportation (ODOT) developed a plan to relocate the Galice Creek Road out of the current Galice Creek location and to move it to the top of the ridge and reroute it along the top to Soldier Camp. This plan has not been implemented nor is there any indication that it will be in the foreseeable future.

D. WATER QUALITY

Changes in water quality and temperatures from reference to current conditions that can stress aquatic life are predominantly caused by riparian vegetation removal, water withdrawals and roads. Water quality parameters known to be affected the most by human disturbances are temperature, sediment and turbidity. Roads are the primary source of sediment in the analysis area.

The recovery of riparian vegetation that will provide shade should bring about the reduction of stream temperatures over time. Road maintenance (drainage improvements including surface regrading to outslope wherever possible) and decommissioning would decrease sedimentation in the analysis area.

E. STREAM CHANNEL

Channel conditions and sediment transport processes in the Rogue - Recreation Watershed have changed since Euro-American settlers arrived in the 1830's primarily due to mining, road building and changes to the riparian vegetation. Hydraulic mining resulted in entrenched channels with greater width/depth ratios. Increases instream gradients and sediment transport were a consequence of the larger width/depth ratios.

Sediment is mainly transported from road surfaces, fill slopes, and ditchlines. Increases in sediment loads are generally highest during a five-year period after construction; however, they continue to supply sediment to streams as long as they exist. Road maintenance and decommissioning would reduce the

amount of sediment moving from the roads to the streams. Roads constructed adjacent to stream channels tend to confine the stream and restrict the natural tendency of streams to move laterally. This can lead to down cutting of the stream bed and bank erosion. Obliteration of stream side roads would improve the situation.

Removal of riparian vegetation has had a major detrimental effect on the presence of large woody debris in the stream channels. There is a minimal amount of large woody debris in the analysis area with many areas lacking the potential for short-term future recruitment. Large woody debris is essential for reducing stream velocities during peak flows and for trapping and slowing the movement of sediment and organic matter through the stream system. It also provides diverse aquatic habitat. Riparian Reserves along intermittent, perennial nonfish-bearing, and fish-bearing streams will provide a long-term source of large woody debris recruitment for streams on federal land once the vegetation has been restored.

F. VEGETATION

Trends in vegetative conditions in the Rogue - Recreation Watershed are increasing densities of trees and shrubs within stands and a shift from historically dominant species to species that were found primarily in the understory. Ponderosa and sugar pine were far more prevalent and often dominated forest stands. Oak woodlands dominated dry lowland slopes. Currently, the Douglas-fir series is prevalent on xeric sites. This plant community transitions into the tanoak series on warm mesic sites and into white fir on cooler mesic sites.

The vegetation conditions in the watershed today are a result of fire suppression and replacing the natural disturbance pattern with human disturbances such as logging, farming, mining and rural development. This has generated two areas of concern:

1) Fire suppression has resulted in many of the forests in the watershed reaching densities of trees and shrubs that are not sustainable over time. In addition, fire suppression has shifted Douglas-fir onto what were formerly ponderosa pine sites, and tanoak and white fir onto what were formerly Douglas-fir sites.

2) Past harvest patterns in the watershed have resulted in removal of economically and biologically valuable tree species such as ponderosa and sugar pine. Also, past harvest patterns have resulted in forest stands in one to two age and size classes.

The vegetative and structural conditions of the forests in the watershed are not constant and have changed frequently with the historic disturbance patterns. Disturbance has played a vital role in creating diverse vegetation types, structures and densities. Fire, insects, disease, periods of drought and the resultant tree mortality have always been components of ecosystem processes and occurred within a range of natural conditions.

Maintaining vegetative diversity and stand densities that are sustainable over time are important terrestrial and riparian ecosystem processes. These important processes have been impacted by the shift from the

historical frequent, low-intensity fires to settlement related disturbances and fire suppression. When forest density, species composition, structure (variety of tree sizes, presence of snags and large down logs, etc.), populations of insects, presence of disease, incidence of stand replacement fire events, and tree mortality occur outside the range of natural conditions, components of the ecosystem process are impacted. This is the current trend in the Rogue - Recreation Watershed.

Past timber harvest patterns in the watershed have tended to simplify forest structures and alter the mix of seral and age class distributions. A high percentage of lands in the watershed exists in small (5-11" DBH) and large (11-21" DBH) pole size classes. This predominance of one size and structure class does not represent the structural diversity found in the reference condition nor the desired vegetative condition of a diverse landscape pattern of vegetation needed to meet the many values being managed for in the watershed. Similarly, fire suppression has contributed to dense pole stands developing over much of the watershed, crowding out important but less shade tolerant mid-seral species such as ponderosa pine, sugar pine and California black oak. Stands consisting of dense poles or of small diameter trees are more vulnerable to stand replacement wildfire. Fire suppression has also permitted tanoak to become a much more significant stand component than in the reference condition in many areas of the watershed.

When forests remain at unsustainable densities for too long, a number of trends begin to occur that effect stand health. Species composition and diversity, relative density, percent live crown ratio, and radial growth are all indicators of how forests can be expected to respond to environmental stresses.

Forests of the Klamath Mountain Province are known for their rich species diversity. For example, within the watershed, there are tree species (western hemlock, brewer spruce and knobcone pine) found in remnant populations. This diversity is not only an important habitat quality for plants and animals, diverse forests are much better able to withstand environmental stresses such as drought and insect and disease attacks.

Species such as ponderosa and sugar pine, California Black oak and Pacific madrone have historically been important components of the forests of the Rogue - Recreation Watershed. These are mid-seral species and to flourish they require the less dense, more open canopy conditions that existed in the forests of the watershed prior to fire suppression. As stand densities increase beyond the range of natural conditions, these species drop out and the forests become dominated by late seral climax dominants such as Douglas-fir at lower elevations, tanoak at mid-elevation sites and true fir at higher elevations. Forests composed of climax dominant species, as is the trend in the watershed, are more unstable and become increasingly vulnerable to environmental stresses.

The amount of federal forest land in the watershed that currently exist in a mature/old-growth condition is approximately 28,307 acres (36%). The percentage that existed in a mature/old-growth condition in the reference condition is estimated to be much less: approximately 7% of the federal forest land.

The increase in acreage is due to sites that were classified as non-timber and not all federal lands had historical survey data available. Also the increase in acreage is that sites classified as ponderosa pine or white oak series and now have Douglas-fir filling in which added an additional structural component. This

component was not present previously due to the shorter interval between fire disturbances. Repeated low-intensity fires did not allow for the establishment of Douglas-fir at the rate now seen in the watershed.

Mature/old-growth forest for the 1920 surveys is defined as any parcels that exceeded 10,000 board feet per acre in conifers. There would have been more volume if 1998 volume criteria was applied. For example, in 1920 conifers were cruised only if they were at least 16" DBH and they were cruised to only a 12-inch top. Anything less than 16" DBH was considered a pole and not counted towards the stand's volume. Today's methods of cruising counts any conifers greater than 7" DBH and cruises all trees to a 5-inch top. Consequently, by today's standards there was more volume present than listed in the revestment notes. Added to this is a hardwood component which provides structure and canopy layering. For these reasons, the 10,000 board foot/acre criteria is used. Even at this level, the Rogue - Recreation Watershed had only a relatively low percentage of the surveyed acres in a mature/old-growth condition. Natural disturbance history as well as human impacts from burning and timber harvest history play an important role in the amount of old-growth existing in the watershed today.

Percent live crown ratio and radial growth are physiological indicators of a tree's ability to produce food and defensive compounds. Healthy live crowns are essential for healthy trees. When the average live crown ratios in a forest stand drops much below 33%, the canopy's ability to support vital processes in the tree becomes diminished. Live crown ratios begin to recede as forests remain in an over-dense condition for too long. When live crown ratios are reduced too far, trees are unable to quickly respond to the release provided by density management thinning and partial cutting management prescriptions may no longer be a forest management option.

Similarly, radial growth rate is an indicator of whether a tree has sufficient resources to support vital physiological processes. Low production of stem wood per unit of foliage has been associated with a tree's inability to accumulate reserves or to produce defensive compounds. Stem growth only occurs once the resource demands of foliage and root growth have been met. When trees are not able to produce sufficient photosynthate and defensive compounds, they become increasingly vulnerable to insect and disease attacks.

Fire is the primary process that the ecosystem has naturally used to lower stand densities and clear out competing understory vegetation. In the absence of fire, insects and disease often become the processes that reduce stand density. Because of densities in forest stands (live fuels) in the Rogue - Recreation Watershed, the build up of dead and down fuels, the checkerboard ownership of private and government lands and the rural residential interface, it is impossible to allow the natural fire regime to control forest densities at this time. At the present time, a naturally occurring fire, such as caused by lightening, would have a high potential to be an intense stand replacement fire and threaten human lives and property.

Port-Orford cedar is an important shade tolerant conifer species along many streams in northwestern California and southwestern Oregon. It can regenerate under its own canopy, providing stream shading and habitat for a number of wildlife species. In a study conducted by Jimerson and Creasy (1991), the Port-Orford cedar series appeared to have the highest species richness of the five primary vegetation series found in northwest California. In areas that have not been logged, stand age frequency shows a dominance

by older stands.

Phytophthora lateralis, a pathogen which kills Port-Orford cedar, is currently found in the Rogue - Recreation Watershed. *Phytophthora* is an exotic species whose spores are carried by water and infest the soil. It is transported by animals, vehicles, people and along streams and in ditchlines during wet weather. Although the pathogen is not threatening the viability of POC as a species, it has the potential to accelerate the death rate of POC.

1. Late-Successional Reserve

The northeast portion of the Rogue - Recreation Watershed includes a portion of the Galice Late-Successional Reserve (LSR). The LSR will be managed to protect and enhance conditions of mature and old-growth (late-successional) forest ecosystems. The management objective is to maintain functional, interacting, late-successional ecosystems. Natural ecosystem processes such as low level disturbances are intended to be maintained.

Late-successional forests provide certain attributes that are different from early-successional and managed forests. These can include: large, live old-growth trees, snags, down logs on the forest floor, logs in streams, complex structure provided by multiple canopy layers, canopy gaps, and species diversity. A primary objective of this LSR is to protect these attributes where they presently exist and to try and manage to promote them where they currently do not exist.

Another important objective of LSRs is the connectivity they provide for a network of old-growth forest ecosystems. The Galice LSR provides an important corridor of older forest habitat between the Kalmiopsis and Wild Rogue Wildernesses. The east/west older forest link helps connect the coastal mountains east across the valley to the Rogue-Umpqua divide.

Approximately 200 acres of important elk habitat areas also exist in the Galice LSR. Several marginal or low-productivity sites (in terms of tree production) on ridgetops are presently in the grass seral stage, but suffer from encroaching brush and some conifers. These sites range in size from several acres to as many as 20. One of the sites is actually the area surrounding the Peavine Lookout where trees which would obstruct the view must be removed at periodic intervals. None of these sites are currently in late-successional condition and encroachment of brush and trees has only occurred since the advent of rigorous fire suppression. These sites maintain soil moisture into the summer season, and form an important habitat base for the well-known Peavine elk herd.

Many acres of forest inside of the established LSR are young, managed stands created through past management practices. Silvicultural manipulation of these early-successional forests can accelerate the development of some of the structural and composition features of late-successional forests.

G. SPECIES AND HABITATS

1. Special Status Plants

Habitat of special status plants differ between the current and reference conditions. Changes have occurred primarily from fragmentation of habitat due to development or timber harvest and changes in species composition due to fire suppression. Fragmentation of late-successional forest habitat which is required by the three Survey and Manage vascular plant species lends uncertainty to the long-term health of these species. As habitat continues to shrink, those populations in existence will become more isolated with little chance of expansion. This will also make them more susceptible to extirpation from chance events (such as a hot-burning wildfire) that could cause major perturbations in numbers of individuals per population and numbers of populations in the region (*i.e.*, southwestern Oregon). As the numbers of individuals decrease, the number of populations decrease and their habitat is reduced, the chance of extirpation of these three species from this region increases.

The reason these species were originally designated as Survey and Manage species was because their future viability was uncertain due to their dependence on late-successional forest habitat. Designated Late-Successional Reserves do not provide refuge for the majority of populations of these species in this region of Oregon. The majority exist on the lower elevation matrix lands. Appendix J2 of the Final Supplemental Environmental Impact Statement (FSEIS) not only discusses the need to protect known sites of these species, but also recommends retaining canopy closures of 60% or greater and protecting mychorrhizal connections. This could also improve the chances for protection of rare non-vascular plant species to thrive and have dispersal corridors.

Besides decreases in late-successional habitat, the biggest difference in habitat affecting species diversity is the reduction in number and size of natural openings. In shrublands, these openings are filling in due to lack of fire which reduces the likelihood for healthy populations of such species as *Eschscholzia caespitosa* and *Delphinium nudicaule.* Both of these species are far less plentiful than the Survey and Manage species already discussed. Maintaining such habitats should not be made a lower priority than the managing of late-successional habitats. The same can be said regarding serpentine habitats, which harbor by far the highest concentrations of special status plants in southwestern Oregon.

While working to maintain such habitats, care must be taken to ensure that any non-vascular Survey and Manage species are protected from treatments that could decrease population viability. This is especially true in areas of black oak where *Dendriscocaulon intricatulum* has been found.

Besides managing late-successional habitat for forest product purposes, an ecosystem management approach would ensure that openings still occur in the late-successional habitat of the Rogue - Recreation Watershed. This is because of the rare endemic species dependent upon such openings. (*Sophora leachiana, Lotus stipularis var. stipularis). Sophora leachiana* especially is dependent upon good habitat in the Rogue - Recreation as the watershed is the main region in which this species exists. With the retention of a mosaic of openings, these species can continue in a more natural setting than their predominant current habitat of skid trails. This is an important goal to ensure that more natural populations

occur of these species to protect them from the introduction of pathogens or large scale disturbances that could reduce the species viability of *Sophora leachiana*, especially. Reduced viability could lead to extirpation of the species.

BLM policy as stated in the Medford District RMP includes the objective of "studying, maintaining or restoring community structure, species composition and ecological processes of special status plants." The RMP includes management actions/directions that require the maintenance or enhancement of habitats such as these. Any treatment to these areas must consider the habitat requirements of the native species depending on them.

2. Aquatic Species

a. Stream and Riparian Trends - Private (Non-Federal) and Federal Lands

The future trend in aquatic habitat conditions in the Rogue - Recreation Watershed will be influenced by three major limiting factors:

(1) Successional stage of vegetation in riparian zones;

(2) the amount of stream flow between early summer and fall, and

(3) the rate and magnitude of sediment delivery.

The expected fish habitat trend in the watershed will vary with land ownership.

b. Riparian Reserves and Coarse Woody Material

Stream side shade and coarse woody material on federal lands will increase. It will take approximately 150-300 years without active riparian management for stream side areas on federal land to attain late-successional characteristics. Active riparian management in many instances will produce large trees faster. Large mature trees will contribute to fish habitat complexity after falling into the stream.

Age and structural diversity of vegetation in riparian areas on federal land may increase in response to BLM and USFS actions that meet Aquatic Conservation Strategy (ACS) objectives. There is no intent to change forest plan Riparian Reserve widths at this time, but to protect and actively manage the Riparian Reserves where it would be beneficial to the attainment of the ACS objectives.

Quality of stream and riparian habitat on private land will decrease as timber harvest proceeds in unentered or lightly harvested timber stands. Revised State Forest Practice Rules set the standards for private lands. These rules allow timber harvest as close as 100 feet from fish-bearing streams. There are no setback or shade requirements on Class 3 and 4 streams on non-federal land. The amount of coarse woody material in the riparian area on private land will diminish due to natural processes or timber harvest. It is not

anticipated that this would be replaced to any appreciable degree because largest conifers in riparian transition zones will be logged when they reach commercial size.

Roads on private woodlands and on private commercial forest land are primarily natural surface with poor drainage. Tractor yarding will continue to be the most frequently used yarding method, even on steep slopes. This will add excess sediment to the streams contributing to suppressed levels of fish survival.

3. Instream - Large Woody Debris

The greatest potential for improvement in complexity of fish habitat on a small watershed scale (smaller than a subwatershed) over the long term will be on federal lands. All streams on federal land will become more effective at dissipating stream flow energy, creating scouring pools, providing complex habitat for fish, amphibians and invertebrates and in the retention of more organic detritus.

Boulders and rubble rather than large wood, play a major role in creating fish habitat in larger streams (>3rd order). However large woody debris continues to be important in the steeper streams by dissipating stream energy (*i.e.*, forming a stepped channel profile), controlling the movement of sediment and small organic matter and providing habitat for fish and amphibians.

Class 3 and 4 streams on forested private land may become less capable of controlling movement of sediment and fine organic material and providing habitat for amphibians because of the lack of amount of large woody debris will decrease over time. Riparian transition zones will remain in early and mid-successional stages on non-federal lands.

4. Sedimentation

Stream sedimentation is expected to decrease in streams on federal lands as a result of the implementation of the ACS and continued incorporation of BMPs in all watershed activities. This assumes new activities will not contribute to existing sedimentation problems. However, there may not be an appreciable overall decrease in the amount of sediment deposited in streams if road construction standards and tractor logging practices do not substantially improve on non-federal lands.

Many roads and tractor skid roads on private lands do not receive regular maintenance, nor were most of them designed with adequate drainage or erosion control features. These problems are expected to continue. Sediment from these areas can be expected to adversely impact streams on public and other non-federal lands downstream.

5. Stream Flow

Stream flows on federal lands during dry seasons are expected to increase in the future as a result of NFP standards and guidelines and Best Management Practices.

Intensity and frequency of peak flows, if they have occurred as a result of management activities, will

diminish as vegetation re-grows in previously harvested areas and as road density is reduced. Potential indirect adverse effects of altered peak flows on salmonid reproduction would diminish. This assumes that timber harvest on private land will continue at no greater than the present rate and that new road construction on private land will not offset efforts to reduce road mileage on public lands.

Irrigation and mining diversions have decreased the amount of water available to fish during low flow periods. Changes in the landscape are caused from agriculture (water diversions), roads and timber harvest. Irrigation withdrawals primarily exacerbated the adverse effects of poor land management and continue to contribute to the decline in the anadromous fishery.

6. Stream Temperature

Water temperatures will increase in Class 1-3 streams on private lands. Until adequate canopy closure is attained within the Riparian Reserves of all the tributaries to and including mainstem Hog and Pickett Creeks.

7. Aquatic Species

Factors outside the watershed that will continue to influence return of anadromous fish to the watershed include ocean productivity, recreational and commercial harvest, predation in the Rogue River and the ocean, habitat changes due to human developments in floodplains, and migration and rearing conditions in the Rogue River. Equal effort must be given to correcting human-related factors that limit fish survival in freshwater and marine environments. Habitat for Pacific lamprey and reticulate sculpin in the Rogue River is expected to remain stable to moderate condition.

Coho salmon are listed as a federally-threatened species. Implementation of the ACS on public land will improve watershed health. Potential for recovery of anadromous fish habitat is good because the majority of the watershed is in federal ownership.

However, there is potential for private landowners to impact stream health downstream. Fewer sediment and temperature tolerant aquatic insect taxa will be present in Rogue River tributaries as watershed conditions improve. Collector-dominated communities in these small streams would gradually shift to scrapers and shredders as canopy closure and the conifer component increases. Composition of aquatic macroinvertebrate communities within the Rogue River will probably remain much as it is.

Current resource management practices and water diversions on private lands, which are beyond the scope of the ACS, will continue to limit potential for recovery of salmon and steelhead habitat and populations. The ACS must be applied equally across all ownerships to achieve potential for recovery of at-risk fish stocks.

Private lands are expected to continue to be managed intensively for wood production. The cumulative effects of management activities have substantially altered the timing and quantity of erosion and have changed instream channels, all which have impacted fish production. Streams and riparian areas with

federal ownership are in much better condition than streams on private lands.

H. WILDLIFE

1. Species

The conservation of native biodiversity by the federal government is limited by a number of factors including: the availability of species to repopulate habitat, land ownership, spatial relationship of the federally-controlled land, and habitat quantity and quality.

The extirpation of native wildlife from an area alters how the remainder of the community functions. Native species play roles that benefit the community as a whole. Removal of one species may lead to a population imbalance in another. Historically, wolves and grizzly bears served as predators in the watershed. The act of predation played a critical role in the community. Prey remains not consumed by the wolf were available to a host of other animals. Deer and elk populations were kept in balance with the vegetation, and the community as a whole benefitted from the predation. When exotic species are introduced into a community the food chain is set out of balance. Historically, the watershed did not contain largemouth bass (*Micropterus salmoides*). The introduction of this species has had deleterious effects on turtles, frogs, and ducks.

Species known to be extirpated from the watershed include grizzly bear and wolf. Wolves have remained on the sensitive species list due to sightings of large canids within southwestern Oregon. Currently, Oregon is not included in the recovery plans for these two species. Species such as the wolverine that have remnant populations in the province may have the ability to recover themselves in this watershed, but due to the checkerboard ownership, the federal government has limited options to promote the remote habitat these species require.

Habitat quantity and quality is a critical factor determining the absence or presence of species in the watershed. Species with narrow habitat requirement such as late-successional forest-dependent species will not maintain populations in areas void of older forest. Table V-1 displays the expected habitat trend for species of concern in the watershed. The majority of federal land the watershed is classified as matrix land. It can be expected that this land will continue to be harvested for timber. The Northwest Forest Plan requires that a minimum of 16-25 large leave trees (+21") per acre be left in all harvested units, which will result in the long run (50+ years) in a multi-age, multi-canopied forest. In the short run it is expected that mature trees will be harvested resulting in a decline of older forest in the watershed. Specific actions such as commercial thinning may possibly hasten the development of older forest in the watershed, which would be beneficial for the majority of the species of concern. At the existing level of management, it is not expected that these forests will retain snags, down wood, high canopy closure, etc., necessary to allow for long-term maintenance of late-successional forest species. To conserve late-successional forest species, it is critical to maintain a minimum of 15% of the watershed in late-successional forest.

Table V-1: Expected Federal Habitat Trends for Species of Concern

Common Name	Habitat	Expected Habitat Trend
Grey wolf	Generalist, prefers remote tracts of land	Decrease in the watershed
White-footed vole	Riparian alder/small streams	Increase in habitat as riparian areas recovers from past disturbance
Red tree vole	Mature conifer forest	Decrease in the watershed
California red tree vole	Mature conifer forest	Decrease in the watershed
Fisher	Mature conifer forest	Decrease in the watershed
California wolverine	Remote/high elevation forest	Decrease in the watershed
American marten	Mature conifer forest	Decrease in the watershed
Ringtail	Rocky bluffs, caves and mines	Possible decrease in habitat as hard rock mines/quarries reopen
Peregrine falcon	Remote rock bluffs	No nesting habitat available
Bald eagle	Riparian/mature conifer forest	Possible increase as riparian areas recover from past disturbance, decrease on matrix lands
Northern spotted owl	Mature conifer forest	Decrease in the watershed
Marbled murrelet	Mature conifer forest	Decrease in the watershed
Northern goshawk	Mature conifer forest	Decrease in the watershed
Mountain quail	Generalist	Stable
Pileated woodpecker	Mature conifer forest/snags	Decrease in the watershed
Lewis' woodpecker	Oak woodlands	Decrease until management strategy developed for oak woodlands
White-headed woodpecker	High elevation mature conifer forest	Decrease in the watershed
Flammulated owl	Mature ponderosa pine/mature Douglas-fir forest	Decrease in the watershed
Purple martin	Forage in open areas near water/cavity nesters	Increase as riparian areas recover and forest mature
Great grey owl	Mature forest for nesting/meadows & open ground for foraging	Increase in foraging habitat, decrease in nesting habitat
Western bluebird	Meadows/open areas	Decrease as clearcuts recover and meadows become encroached with trees
Acorn woodpecker	Oak woodlands	Decrease until management strategy developed
Tricolored blackbird	Riparian habitat/cattails	Stable/increase as riparian habitat recovers
Black-backed woodpecker	High elevation mature conifer forest	Decrease in the watershed
Northern pygmy owl	Conifer forest/snags	Decrease in the watershed

Table V-1: Expected Federal Habitat Trends for Species of Concern

Common Name	Habitat	Expected Habitat Trend
Grasshopper sparrow	Open savannah	Decrease until management strategy developed for savannah habitat
Bank swallow	Riparian	Increase as riparian habitat recovers
Townsend's big-eared bat	Mine adit/caves	Decrease as trees around caves/adits harvested
Fringed myotis	Rock crevices/snags	Decrease in the watershed
Silver-haired bat	Conifer forest	Decrease in the watershed
Yuma myotis	Large trees/snags	Decrease in the watershed
Long-eared myotis	Large trees/snags	Decrease in the watershed
Hairy-winged myotis	Large trees/snags	Decrease in the watershed
Pacific pallid bat	Large trees/snags/rock crevices	Decrease in the watershed
Western pond turtle	Riparian/uplands	Increase as riparian habitat recovers
Del norte salamander	Mature forest/talus slopes	Decrease in the watershed
Foothills yellow-legged frog	Riparian/permanent flowing streams	Increase as riparian habitat recovers
Red-legged frog	Riparian/slow backwaters	Increase as riparian habitat recovers
Clouded salamander	Mature forest/snags/down logs	Decrease in the watershed
Southern torrent salamander (Variegated salamander)	Riparian/cold permanent seeps/streams	Increase as riparian habitat recovers
Black salamander	Talus/down logs	Decrease in the watershed
Sharptail snake	Valley bottom	Stable
Calif. Mtn. Kingsnake	Generalist	Stable
Common kingsnake	Generalist	Stable
Northern sagebrush lizard	Open brush stands	Stable
Tailed frog	Riparian/mature forest	Increase as riparian habitat recovers

2. Dominant Processes from Historic Condition to Current Conditions

The settlement of the watershed, and the subsequent division of land between the public and private ownership has limited the ability of the federal agencies to restore historic conditions in the watershed. Currently, the checkerboard ownership pattern of the federally-managed land and the fragmentation and patch size of the remaining late-successional forest habitat will partially determine the ability of the watershed to support many species of concern. This is particularly true for species with low dispersal capabilities such as the red tree vole and the Del Norte salamander. In addition, the limited federal control of some plant communities prohibits the recovery of species of concern without the involvement of private

landowners. These habitats include native grasslands, oak savannahs, and anadromous fish bearing streams (riparian habitat). In addition, the suppression of fire within the watershed has changed vegetation patterns and historic habitat distribution. Species dependent on fire-created habitats have been negatively impacted through fire suppression. The majority of the species of concern are associated with late-successional habitat. This habitat has been altered, both on private and federally-managed lands by timber harvest. Species associated with this habitat type have been affected through the conversion of older stands to younger stands. At the same time, species utilizing early seral habitat and edges have benefitted from this shift of older forest to younger forest. Timber harvest and road building has also led to increased sedimentation, increased stream temperatures, and decreased stream stability and structural diversity, which in turn negatively affects aquatic and semi-aquatic wildlife. Road building also negatively decreases the effectiveness to a number of habitats due to disturbance, and have further fragmented patches of late-successional forest.

The trend for habitats found on federally-administered land is essentially determined by the Northwest Forest Plan. Broadly speaking the Rogue - Recreation Watershed is composed of matrix land, Riparian Reserves, late-successional reserve and 100-acre spotted owl cores (managed LSRs). The success of the reestablishment of population of old-growth forest species will depend on habitat requirements of the species, dispersal capabilities, habitat condition in the watershed, and ownership pattern.

Potential limiting factors for the recovery of habitats of sensitive species exist in the watershed including fire suppression and habitat loss and fragmentation. Historically, many habitats within the watershed were created and maintained by disturbance events, specifically fire. Fire for the most part has been essentially excluded from the watershed for the last 80 years. Fire created habitats and associated wildlife species have been adversely affected by this. This is particularly true for oak/savannah and pine stands. Currently timber harvest is the dominant disturbance factor found in the watershed.

Habitat loss and fragmentation occurs both on the valley floor as well as the uplands. Habitats found along the valley floor have experienced fragmentation due to conversion to homesites and agricultural land. Due to this fragmentation, reduced patch size and poorer access for wildlife, many sites no longer function to their biological potential. Of particular concern is the remaining oak woodlands and ponderosa pine sites. The loss of these habitat type will continue to contribute to the decline of associated species of wildlife. Tracts of public land are critical in insuring that this habitat type and the biodiversity it supports remain represented in the watershed.

Historically, the amount of old-growth forest found in the watershed was never stable and continually fluctuated through time. Forests are constantly developing towards their climax community, while simultaneously being set back to earlier seral stages by disturbances. Historically, when large scale disturbances moved through the watershed the amount of old-growth would be low. As time passed the old-growth habitat would recover, allowing species associated with this habitat to recolonize into the watershed. Colonization was aided by the higher population level of old-growth dependent species as well as the greater amount of mature and old-growth forest historically present in the region. This larger amount of old-growth forest allowed for greater connectivity of habitat and easier dispersal of species associated with this habitat. Due to the checkerboard ownership pattern outside the LSR and past timber

harvesting, the remaining mature and old-growth habitats are widely fragmented. Species dependent on older forest such as the American marten (*Martes americana*), the fisher (*Martes pennanti*) and the northern spotted owl (*Strix occidentalis*) have limited habitat outside the LSR. Some of the remaining older stands no longer serve as habitat for late-successional forest-dependent species due to the amount of edge the stands contain which is increased by irregular shapes and small sizes. The edge to interior ratio effects how useful the stand is for some late-successional species. Stands with a great deal of edge no longer function as interior forest. The micro-climatic changes of the "edge effect" can be measured up to three tree lengths in the interior of the stand (Chen 1991).

Isolated patches of old-growth habitat may also be too small to support the maximum diversity of species. In heavily fragmented environments, larger predators that naturally occur at low densities are lost first (Harris and Gallagher 1989). The California wolverine (*Gulo gulo luteus*) utilizes high elevation undisturbed habitat and their population is now of concern due to fragmentation. Fragmented habitats leads to isolated populations of animals which lose genetic vigor, and is a serious threat to biological diversity (Wilcox and Murphy 1985). Intact old-growth corridors are critical for insuring gene pool flow, natural reintroduction and successful pioneering of species into unoccupied habitat. Animals disperse across the landscape for a number of reasons including food, cover, mates, refuge, and to locate unoccupied territories. The vast majority of animals must move during some stage of their life cycle (Harris and Gallagher 1989). Dispersal corridors function when they provide hiding and resting cover. Species that depend on late-successional forests are poor dispersers and more vulnerable to extinction in fragmented landscapes than species associated with early successional stages (Noss 1992). This is particularly true for flightless species such as the fisher (*Martes pennanti*). Fishers are reluctant to travel through areas lacking overhead cover (Maser, *et al.,* 1981) and are at risk for genetic isolation. Species that are more mobile, such as the spotted owl, may be capable of dispersing into isolated patches of habitat but run a higher risk of predation when crossing areas of unsuitable habitat.

Small patches of old-growth forest can provide important refugia for poor dispersers and species with small home ranges such as the Del Norte salamander (*Plethodon elongatus*), allowing for recolonization into surrounding areas if future conditions become more suitable. Isolated patches of old-growth forest also offer important refugia for a number of late-successional associated bryophytes, fungus and plants.

Areas with a high density of roads in the watershed are of concern due to their effects on habitats. The construction of roads contributes to sediments in the aquatic system. Road building along streams has also led to increased channelization of the stream. Sediments can negatively effect fish by filling pools, embedding spawning gravel and smothering eggs. Roads also lead to increased disturbance, such as poaching and decrease habitat effectiveness. Increased disturbance to deer and elk increase their metabolic rate and decrease their reproductive success (Brown 1985). Roads also further fragment patches of old-growth forest creating "edge" which changes interior forest conditions and allows generalist species to compete with old-growth dependent species. Species such as the great horned owl (*Bufo virginianus*) utilize fragmented landscapes, and prey on spotted owls.

3. Expected Habitat Trends

The habitat trends for species of concern varies with ownership and plant community. In general habitats found on private lands have undergone the most significant change from historic conditions. Federal public land management has undergone less dramatic change but are notably different from conditions found in pre-settlement times. Expected trends on private lands are nearly impossible to gauge, but there is a tendency for short-term rotation on forest lands (60-80 years), and heavy use of most native grasslands, riparian, and oak woodlands for agriculture and home site. Native plant communities such as grasslands, pine stands, oak savannahs and old-growth forest, along with their associated animal communities, should be considered at risk on private lands. Expected habitat trends for each plant community are as follows:

Riparian: The condition of the riparian habitat is dramatically different from pre-settlement conditions. Timber harvest, road building, water withdrawals and urbanization has led to poor functioning stream systems in many instances. Recovery of the aquatic biodiversity on public land is partially limited due to the condition of private land in the watershed. Many of the low gradient streams found in the watershed are under private ownership. These areas historically contained the best spawning habitat for fish. The expected trend for riparian habitat is to remain static or decrease in condition due to an in demand on resources. Quality of riparian habitat on federally-administered land should increase under the forest plans. Cooperative agreements of all parties within the watershed would be necessary to insure continued viable population of fish and wildlife.

Pine Habitat: Maps produced in 1856-1894 by the General Land Office characterize portions of the valley floor as being dominated by oak and pine. Many of these stands have been lost on private land through timber harvest and conversion to home sites and agriculture. The majority of pine stands on public land have seen some form of timber management, other stands have been allowed to degrade due to fire suppression and encroachment of fire intolerant species. The expected trend on private land is for continued harvesting of this habitat on a short-term rotation basis. Pine habitat found on matrix land will continue to be available for timber harvest. Pine habitat found on withdrawn land will continue to degrade in quality until such time that a management strategy has been developed.

Oak woodlands: Oak woodlands within the watershed are disappearing faster then they are regenerating themselves. The precise amount of this habitat type historically found in the watershed is unknown, but the current quantity of this habitat are thought to be a fraction of what historically occurred. The expected trend on private land is for oak woodlands to remain static or decline. The majority of federally-managed oak woodland are found on land withdrawn from the timber base and have been largely unmanaged. Natural disturbance such as fire have been reduced, and many of these stands are in poor condition. The expected trend is for further habitat degradation until these problems can be addressed with a management strategy.

Old-Growth Forest: Little if any private old-growth forest remains in the watershed. Due to short rotations between timber harvests on private land, there is not expected to be an increase in old-growth forest on private land. Quantity and quality of old-growth forest located on federally-administered old-growth forest located in the matrix land is expected to decrease under the current management plan.

4. Species

The conservation of native biodiversity by the federal government is limited by a number of factors including the availability of species to repopulate habitat, land ownership, spatial relationship of the federally-controlled land and habitat quantity and quality.

The extirpation of native wildlife from an area alters how the remainder of the community functions. Native species play roles that benefit the community as a whole. Removal of one species may led to a population imbalance in an another. Historically, wolves and grizzly bears served as a predators in the watershed. The act of predation played a critical role in the community. Prey remains not consumed by the wolf were available to a host of other animals. Deer and elk populations were kept in balance with the vegetation, and the community as a whole benefitted from the predation. When exotic species are introduced into a community the food chain is set out of balance. Historically, the watershed did not contain largemouth bass (*Micropterus salmoides*). The introduction of this species has had deleterious effects on turtles, frogs, and ducks.

Species known to be extirpated from the watershed include grizzly bear and wolf. Wolves have remained on a sensitive species list due to sightings of large canids within southwestern Oregon. Currently, Oregon is not included in the recovery plans for these two species. Species such as the wolverine that have remnant populations in the province may have the ability to recover themselves in this watershed, but due to the checkerboard ownership pattern, the federal government has limited options to promote the remote habitat these species require.

Habitat quantity and quality is a critical factor determining the presence or absence of species in the watershed. Species with narrow habitat requirement such as late-successional forest-dependent species will not maintain populations in areas void of older forest. The amount of recovery or loss of a species population varies between species, but in general it is expected that species requiring late-successional forest will decrease in numbers on lands classified as matrix and increase in numbers within the LSR.

I. FIRE MANAGEMENT

A major difference between existing and reference condition is the change in the fire regime. The watershed has gone from a low-severity to a high-severity fire regime. Previously, fire has occurred frequently and burned with low intensity, and functioned largely in maintaining the existing vegetation. Currently, fire is infrequent, burns with high intensity, and causes high degrees of mortality, replacing vegetation rather then maintaining it. This has resulted from nearly a century of fire suppression and exclusion. The change in vegetation conditions, fuel profile and amount of fuel present is now such that the impacts from a large wildfire will produce severe effects on vegetation, erosion, habitat and water quality. Stand replacement from wildfire impact was a low percentage in the reference condition. Existing conditions will produce 50% to 75% stand replacement today. The Galice Fire in 1987 is an example of the effect that can be expected at this time and in the future. The current trend is for increasing fuel hazard build up and increasing risk for fire ignition due to population growth and human use within the watershed and adjacent region.

The magnitude of this change is widespread throughout the entire watershed. Only 4% of the watershed is currently in a low hazard condition. High hazard conditions occur throughout the watershed and cover nearly 68% of the area. Vegetation in the watershed is at a high degree of risk for mortality and stand replacement from wildfire. The existing and future trend in fuel and vegetation conditions is the predominant factor that will adversely effect the ability to achieve most management objectives for the watershed. The capability of the watershed to achieve and meet management objectives is low in the long term (20+ years).

Risk of ignition has increased within the watershed. This is a result of the higher population residing within and adjacent to the watershed. Another factor is the increase in recreational use of the watershed. This has occurred in use of the Rogue River and surrounding area and in use of the upland area trails and roads.

J. HUMAN USE

Significant changes have occurred in the watershed. This includes more roads throughout the area, some of which were constructed because of BLM timber sales to access and to manage BLM lands. Many other roads were constructed on private land to access and develop properties. More people are living in the area because of the increase in population in southwestern Oregon as well as people's desires to move out of the city into a rural area. This is particularly true in the area between the mouth of the Applegate and Pickett Creek. With this increase in population and access, comes an increased use of public lands. The type of recreational use is also changing from non-motorized to motorized (before roads, there were mainly trails which accessed the area). In the past 10 years, there has been less federal timber cutting and more private timber cutting. The demand for timber has been on the private lands, due to federal injunctions, ecosystem management and the high monetary value of timber. Due to the increase in population and access, as well as an increase in landfill fees, there has been an increase in the illegal use of the watershed from dumping to living on BLM land to firewood cutting and collection.

As the popularity of river recreation continues to grow, so does total use on the 47-mile recreation section of the Rogue included within this watershed. The popularity of small individually piloted float craft (inflatable kayaks) has grown exponentially in the last few year. Motorized boating and larger oar and paddle rafts are also on the increase.

As pressure on the recreation resource increases, the BLM will institute management actions that will maintain the high quality recreation experience that users of the river demand. Such management actions are currently being evaluated within the context of the "Hellgate Recreation Area Management Plan and EIS," due to be completed in 1999. These actions will run the spectrum from no use controls to strict use controls. Of note in this process is the fact that commercial use of motorized vessels has been administratively limited since 1990.

Settlement patterns have historically centered around the Rogue River and mining towns, where current settlement trends continue. These sites include the townsite of Galice, Pickett Creek, Riverbanks Road, and scattered residences along the river.

The anticipated result of these social or demographic changes/trends that could have ecosystem management implications include an increase in population which increases the demand for use (or abuse) of public lands.

VI. MANAGEMENT RECOMMENDATIONS

A. PURPOSE

The purpose of this Recommendations section is to bring the results of the previous steps to conclusion by focusing on management recommendations that are responsive to watershed processes identified in the analysis. Recommendations also document logic flow through the analysis, linking issues and key questions from step 2 with the step 5 interpretation of ecosystem understandings. Recommendations also identify monitoring and research activities that are responsive to the issues and key questions and identify data gaps and limitations of the analysis (*Federal Guide for Watershed Analysis*, Version 2.2, 1995.)

B. RECOMMENDATIONS

Tables VI-1 through VI-6 list recommended management actions that will lead towards the desired future condition of the Rogue - Recreation Watershed. These tables are organized by land allocation. Actions that are required by the RMP or other decision documents and which will be done as a matter of course may not be included within the recommendations tables.

C. DATA GAPS

Currently identified data gaps of particular interest are listed in Table VI-7.

Table VI-1: Recommendations - All Land Allocations

Land Allocation	Issue/ Concern	Related Core Topic	Location	Recommendation
All	Special Status/Survey & Manage Plants	Species and Habitat (Botany)	Watershed Wide	Survey entire watershed for special status and Survey and Manage plants (both vascular and non-vascular), protect known sites during ground disturbing activities with a minimum of 100-foot radius buffers. Using an ecosystem management approach, institute management strategies to maintain/improve these species habitats using such techniques as prescribed fire where impacts to Survey and Manage species would not occur.
All	Ponds	Species and Habitat (Wildlife), Human Uses (Fire)	Watershed Wide	Where possible, improve ponds to enhance their value to wildlife and fire suppression.
All+	Deer Winter Range	Species and Habitat (Wildlife)	Areas Located Below 2,000 Feet	Seasonal closure of roads in areas identified as important deer winter range, minimize new permanent road construction and restrict management activities between November 15 to April 1.

Table VI-1: Recommendations - All Land Allocations

Land Allocation	Issue/ Concern	Related Core Topic	Location	Recommendation
All	Inventory	Hydrology, Stream Channel	Watershed Wide	Inventory and classify all streams. Inventory all stream riparian areas for proper functioning condition. Gather comprehensive data to be used for future recommendations to be incorporated in this document.
All	Watershed with Mixed Ownership	All	Non-BLM lands	Work with non-BLM landowners through watershed councils, partnerships, Wyden Amendment, etc. Projects could include working with sensitive plants and their habitats, restoring riparian and fish habitat, modifying irrigation diversions, and fish barriers that jeopardize juvenile fish passage, roads, wildlife, fire, recreation projects and current vegetation treatments.
All	Serpentine Habitat	Species and Habitat (Botany), Vegetation	Serpentine Sites	Institute a prescribed fire of low intensity to reduce herbaceous layer accumulation and shrubs/trees encroachment, ensure ground disturbing activities such as OHV use are kept to a minimum. Restore Jeffrey pine sites.
All	Meadows, Oak Groves, Shrublands, Ponderosa Pine Sites	Species and Habitat (Botany, Wildlife), Vegetation	Watershed Wide	Restore (thinning, brushing and burning) ponderosa pine, Oregon white oak, meadows and shrubland habitat.
All	Noxious Weeds	Species and Habitat (Botany), Vegetation	Watershed Wide	Develop an active eradication program for noxious weeds in the watershed.
All	Monitoring	All	Watershed Wide	Implement additional monitoring as a standard aspect of projects. Monitor relative abundance, and distribution of fish species, classify all streams, conduct benthic macroinvertebrate surveys at 5-10 year intervals, survey fish habitat at 10-15 year intervals, inspect all culverts, monitor effectiveness of fish structures, annual population studies of salmonids. Locate and monitor areas susceptible to soil erosion. Field survey for mass movement features in areas mapped with high susceptibility, also field survey for areas with streambank erosion features. Inventory and monitor for compaction and disturbance features, check for indicators of changes in productivity. Monitor relative abundance and distribution of special status species. Monitor growth of young (less than 50 years) stands to see how they compare to computer models predicting growth.
All	Road Closures	Fire	Watershed Wide	Utilize gate closures during periods of very high to extreme fire danger.

Table VI-1: Recommendations - All Land Allocations

Land Allocation	Issue/ Concern	Related Core Topic	Location	Recommendation
All	High Intensity Fire Occurrence	Fire, Erosion Processes, Wildlife	Watershed Wide	Implement fuel hazard reduction treatments at strategic locations throughout the watershed. These areas would be located on areas such as ridgetops or other natural or human made features which can function as barrier to wildfire spread; along property boundaries, within or around areas of high values at risk of loss from wildfire. These would create opportunities to compartmentalize wildfires into small drainages and prevent large scale wildfire occurrence. Additionally, they reduce the risk of a high- intensity fire occurrence and return to a condition that would exhibit a low-intensity fire regime
All	Helispots	Fire	Watershed Wide	Create helispots and pump chances as opportunities and need is identified.
All	Fire Hazard	Fire, Human Uses	Watershed Wide	Fuel hazard reduction on BLM lands adjacent to private land with high priority for those adjacent to residential areas. Encourage coordinated approach with private owners/managers.
All	Wildlife Habitat Connectivity	Wildlife	Watershed Wide	Identify critical areas that provide connectivity for late-successional species. Consider the importance of these sites in landscape planning.
All	Dispersed Recreational Use	Human Uses	Watershed wide	Conduct Recreation Opportunity Spectrum Inventory on BLM lands within the watershed to determine amount, type of use, as identified in data gaps. Use this information to provide recreation sites where needed. Pursue cooperative agreements and MOUs between BLM, other government agencies and private landowners to promote recreation opportunities.
All	Off Highway Vehicle Use	Human Uses, Erosion Processes, Water Quality, Species and Habitat	Quartz Creek OHV Area	Prepare management plan for the 7,120 acre Quartz Creek OHV area to determine impacts, use and provide management recommendations, as identified in data gaps. Include fire management plan in OHV management plan.
All	Sociological Information	Human Uses	Watershed Wide	Conduct study to acquire sociological information on trends and community issues for the watershed, and incorporate that information into the watershed analysis, as identified in data gaps.
All	Illegal Use of Watershed	Human Uses	Watershed Wide	Minimize the amount of illegal human use of the watershed (dumping, firewood cutting, occupancy) by enforcing rules and regulations, increasing visible presence in the area and educating the public about protection of resources. Clean up and close dump sites. Consider road access restrictions. Include these considerations in the Transportation Management Objectives process (TMOs). TMOs need to be completed and road closures need to be established in the Federal Register, as identified in data gaps.

Table VI-1: Recommendations - All Land Allocations

Land Allocation	Issue/ Concern	Related Core Topic	Location	Recommendation
All	Public Outreach	All	Watershed Wide	Provide public outreach to inform residents of the need for and the feasibility of implementing watershed projects.
All	Mine Shafts/Adits	Mining, Human Uses, Species and Habitat	Watershed Wide	Inventory mining shafts to determine wildlife habitat, access and safety issues.

Table VI-2: Recommendations - Matrix Land Allocation

Land Allocation	Issue/Concern	Related Core Topic	Location	Recommendation
Matrix	Recreational Use of Trowbridge Ponds	Human Uses	Trowbridge Ponds	Develop Trowbridge Ponds area to provide a variety of recreational uses.
Matrix	Potential Dam Overflow	Hydrology, Soils	Trowbridge Ponds	Develop a plan to correct drainage overflow potential in the lower pond (install overflow valve and build up dam)
Matrix	Matrix	Species and Habitat (Wildlife, Botany)	Mapped Locations	When planning projects, conduct forest management activities in a manner that mimics natural disturbance, maintains species and structural diversity. Create a mosaic of openings in mature stands through thinning or prescribed fire to provide a more natural habitat for *Sophora leachiana*.
Matrix	Hazard Reduction	Fire	Watershed Wide	Pursue hazard reduction treatments along midslope and ridge top road systems on BLM lands. This would create defensible zones and opportunities for suppression forces to contain fires and potentially prevent ridge top to valley floor fire occurrence.

Table VI-2: Recommendations - Matrix Land Allocation

Land Allocation	Issue/Concern	Related Core Topic	Location	Recommendation
Matrix	Young Stand Management	Vegetation	Watershed Wide	Forest management activities should emphasize young stand management as a priority (less than 50 years). Embark on a young stand management plan (brushing, precommercial thinning, hand piling and burning the resulting slash) in natural stands as well as old clearcuts. Priorities for management should be on-site quality, not whether or not the area has been clearcut. The best sites get the first treatment(s). "Link" treatments; projects should not be seen as single events, but rather a sequence over time culminating in desired future condition. Example: stand initiation (new age class) to initial canopy closure of the desired number of trees by species per acre. This would incorporate multiple treatments over a 10 to 20 year project window and enhance planning/budgeting efforts.

Table VI-3: Recommendations - LSR Allocation

Land Allocation	Issue/Concern	Related Core Topic	Location	Recommendation
LSR	Mining ditches	Human Uses, Soils, Hydrology	Peavine area	Inventory mining ditches as potential for historic/recreational trail systems. Restore natural drainage where it doesn't conflict with the historical integrity of the ditch.
LSR	Habitat	Species and Habitat	LSR wide	In areas where more then 40% of the home range of spotted owls is suitable habitat, thin stands less then 80 years of age, to accelerate the development of older-forest components.
LSR	Elk Habitat	Species and Habitat	Elk Management Area	Enhance elk habitat by increasing forage opportunity by creating small openings, conduct prescribed burns and seed closed roads.
LSR	Canopy Closure	Hydrology	LSR Wide	Manage the transient snow zone for high canopy closure. Minimize openings so that at least 70% total canopy cover is retained where possible. This does not apply to early seral stages.

Table VI-4: Recommendations - Special Areas

Land Allocation	Issue/Concern	Related Core Topic	Location	Recommendation
Special Areas	Spotted Owl Cores	Species and Habitat (Wildlife)	Provincial Home Range of Known Sites	Evaluate the potential to increase the amount of McKelvy 1 & 2 within provincial home range to standards developed by U.S. Fish and Wildlife Service (1,388 acres within 1.3 miles of spotted owl cores as of January 1, 1994).
Special Areas	High Value Areas at risk	Fire	Watershed Wide	Reduce fuel hazard within or adjacent to high value area at risk stands. Objective would be to preserve these stands in the short term from loss to wildfire.

Table VI-5: Recommendations - Congressionally Withdrawn Areas

Land Allocation	Issue/Concern	Related Core Topic	Location	Recommendation
Rogue National Wild and Scenic River	Visual Resource Management/ Mining	Recreation, Mining	Yew Creek to Grave Creek	Complete the mineral withdrawal in this section of river. (See RMP, page 2-48.)

Table VI-6: Recommendations: Riparian Reserves

Land Allocation	Issue/Concern	Related Core Topic	Location	Recommendation
Riparian Reserves	Large Woody Debris (Instream), Coarse Woody Debris (Riparian Area)	Species and Habitat (Aquatic), Erosion Processes, Water Quality, Water Quantity	Watershed Wide	Complete stream and riparian surveys for large/coarse woody debris, as well as Proper Functioning Condition, Rosgen Class, etc. Where appropriate, improve instream complexity by adding key pieces of wood (60 cm minimum diameter, minimum length of one bankfull width). Determine appropriate number of pieces of wood per mile based on plant community. Conduct research in order to establish local standards for down wood. Long-term goal is to reestablish coarse woody material consistent with characteristics of the plant series in the riparian zone.
Riparian Reserves	Fish passage	Species and Habitat (Aquatic), Human Uses	(Hog, Stratton, Galice and Pickett Creeks)	Improve or remove culverts at stream crossings located on BLM land that jeopardize juvenile and adult fish passage. Culverts on fish-bearing streams should have natural streambed. Replace existing structures mentioned in Chapter 3, Fisheries section.
Riparian Reserves	Headwater Condition	Species and Habitat (Aquatic)	Watershed Wide	Evaluate headwater tributaries for sediment production, water contribution and riparian potential.

Table VI-6: Recommendations: Riparian Reserves

Land Allocation	Issue/Concern	Related Core Topic	Location	Recommendation
Riparian Reserves	Sedimentation	Species and Habitat (Aquatic), Erosion Processes, Water Quality	Watershed Wide	Wherever possible strive towards restoring spawning or riffle substrate embeddedness to 30% or less and sand content to 15% or less by reduction of fine sediment load and addition of structure. This would ensure adequate spawning gravels for adults. Erosion and sedimentation would be in balance with stream transport capacity resulting in pools with good depth and cover.
Riparian Reserves	Fish Habitat	Species and Habitat (Aquatic)	Pickett Creek and other streams	Improve instream structures to increase fish passage and decrease width/depth ratio in Pickett Creek. Analyze other tributary streams, prioritize for potential fish habitat improvement, plan and implement where appropriate.
Riparian Reserves	Mining and occupancy	Hydrology, Water Quality, Human Use, Species and Habitats	Watershed Wide, Galice, Pickett Creeks	Investigate mining impacts on valuable salmon spawning habitat, especially in the lower gradient reaches of Rogue River's tributaries, as identified in the data gaps.

Table VI-7: Data Gaps

Core Topic	Data Gaps
Botany	**Nonvascular plants**: No surveys have been conducted, need to survey for at least Survey & Manage species (Strategy 2 and Protection Buffers). **Vascular plants**: Only approximately 20% of the watershed has been surveyed, need to survey the remainder. **Noxious weeds**: No surveys have been conducted. Need to tackle eradication of purple loosestrife from Rogue River corridor in the watershed. **Wetlands/Seeps**: Little known about location and extent and no special status plant surveys done in this habitat.
Wildlife	Presence/Absence information for most of the special status species is unknown. Little information on special status species habitats and condition of these habitats. Location of unique habitats such as wallows, mineral licks, migration corridor for the most part is unknown.
Fisheries	Physical habitat surveys have not been completed in the following streams and their tributaries: Galice, Dutcher, and Shan Creeks. Non-salmonid fish distribution throughout the watershed is unknown. Non-native fish distribution throughout the watershed is unknown. There is little information on adult escapement, in the form of spawning surveys. More information is needed on mining's impact on salmonid populations. There is no temperature information on the following streams: Rocky Gulch, Stratton, and Little Stratton Creeks. Macroinvertebrate surveys have not been completed in the following streams: Centennial, Rocky, Panther Gulches, Dutcher, Stratton, Little Stratton Creeks. Location of features contributing to increased sediment problems is unknown.
Human Use	**Transportation Management Objectives (TMOs)**: TMOs have not been completed for this watershed. They will be completed as required under the BLM Western Oregon Transportation Management Plan of 1996. This will result in the identification of road improvements, decommissioning, and other road management needs in the watershed. **BLM Non-Capitalized Roads and Skid Trails**: These types of roads and skid trails have not been inventoried. **Recreation**: There has been no inventory of the amount or type of recreational use of the area. There also has been no Recreation Opportunity Spectrum Inventory of the existing opportunities that are available in the watershed, other than on the Rogue River corridor. In order to manage for recreational values, these inventories need to be done, especially the ROS Inventory. There has been no management plan done for the Quartz Creek OHV area. Dispersed recreation trails and mining ditches have not been inventoried and mapped. **Sociological**: There needs to be a study done on trends and community issues to be incorporated into the watershed analysis.
Hydrologic Riparian	Stream surveys (proper functioning condition, coarse wood, stream class, riparian vegetation) have not been completed on BLM lands. Coarse woody debris needs to be surveyed in the Riparian Reserves. Plant and animal species that inhabit the Riparian Reserves need to be surveyed.
Soils	Soil erosion sources not specified to location and mechanism. There is no information specific to this watershed regarding soil dependent biological communities. More information on road densities and cumulative effects is needed about small watersheds within Rogue - Recreation Watershed. More information about effects of varying levels of ground disturbance is needed.
Fire	Identification of individuals who have special concerns with prescribed burning emissions, smoke dispersion modeling and amounts of smoke produced from understory burning is largely unknown. Baseline emission data for various plant association and theoretical emission information for various plant association is absent.

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Appendix A: Maps

Map 1 GENERAL LOCATION OF THE BIG HOG WATERSHED

July 1996

John McGlothlin

R8W R7W R6W

T34S

T35S

T36S

SCALE 1:140000

Map 2 GOVERNMENT OWNERSHIP IN THE BIG HOG WATERSHED

August 1998

John McGlothlin

N

LEGEND

BLM LAND

STATE LAND

WATERSHED BOUNDARY

USFS LAND

JOSEPHINE COUNTY LAND

No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual use or aggregate use with other data.

R8W R7W R6W

T34S

T35S

T36S

SCALE 1:140000

Map 3 LAND USE ALLOCATIONS ON BLM LANDS IN THE BIG HOG WATERSHED

LEGEND

- MATRIX
- LSR
- WILD ROGUE RIVER
- REC. ROGUE RIVER
- TIMBER RIGHTS ONLY
- 100-ACRE OWL CORE
- CONNECTIVITY BLOCK
- ROGUE RIVER CORRIDOR BOUNDARY
- WATERSHED BOUNDARY

N

August 1998

John McGlothlin

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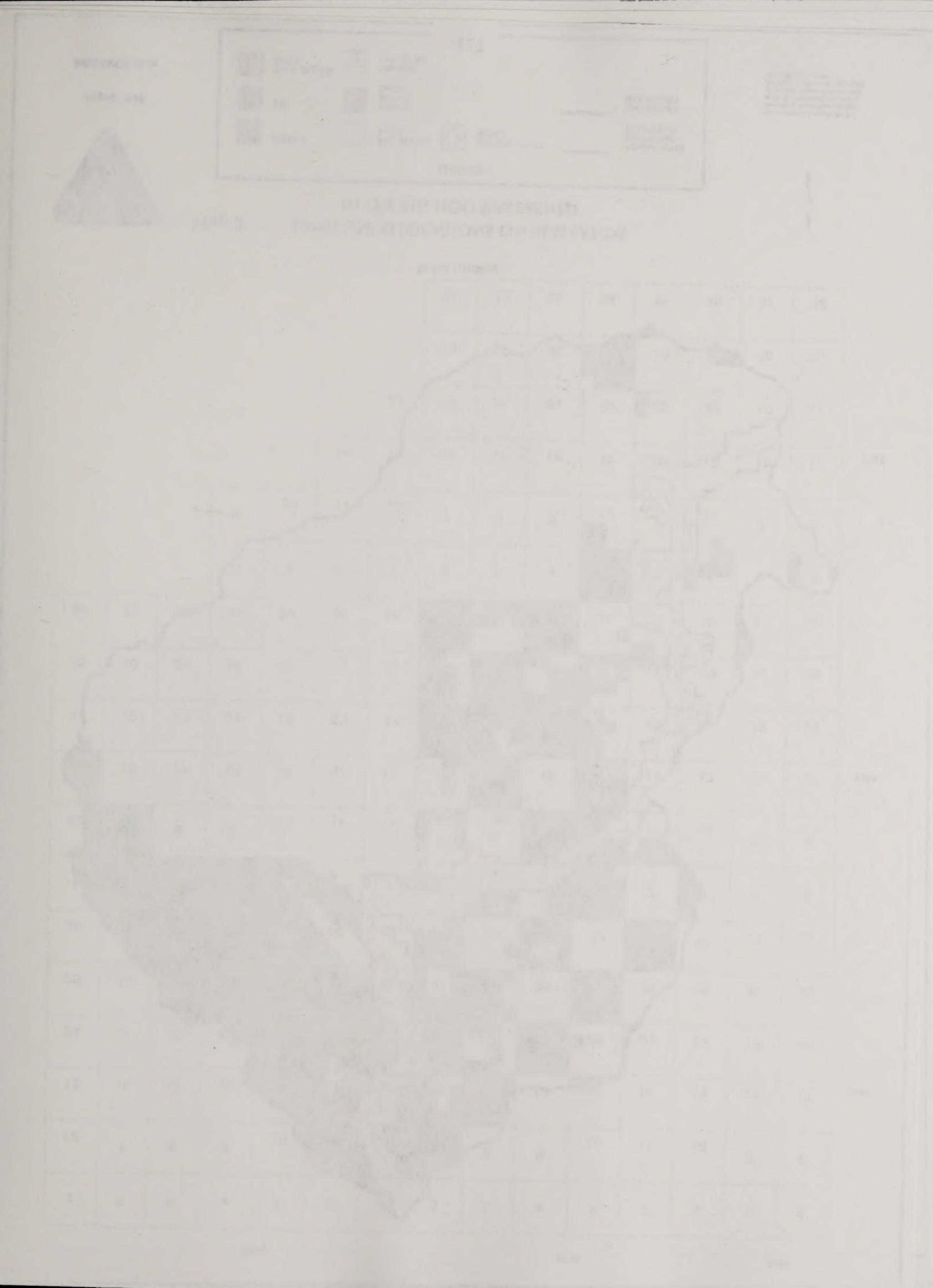

R8W R7W R6W

T34S

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T36S

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SCALE 1:140000

December 1998

John McGlothlin

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Map 4 GENERAL SOIL TYPES IN THE BIG HOG WATERSHED

- Newberg-Camas-Evans
- Takilma-Tochlin-Kerby
- Clawson-Jerome
- Pollard-Abegg
- Brockman
- Holland-Barron-Siskiyou
- Vannoy-Manita-Voorhies
- Josephine-Speaker-Pollard
- Beekman-Vermisa-Colestine
- Siskiyou-Tethrick
- Pearsoll-Dubakella-Fightlar
- Cornutt-Dubakella
- Jayar-Althouse
- Crannler-Goodwin-Rogue
- Water
- WATERSHED BOUNDARY

R8W R7W R6W

T34S

T35S

T36S

SCALE 1:140000

Map 5 DOMINANT VEGETATION ON NON-USFS LANDS IN THE BIG HOG WATERSHED

August 1998

John McGlothlin

N

LEGEND

NON-VEG.	GRASS	HARDWOOD/ CONIFER	D.FIR/ PINE	W.FIR
DEVELOPED, NON-VEG.	SHRUB	P.PINE/ SHRUB	D.FIR	USFS LAND
DEVELOPED, VEGETATED	HARDWOOD	J.PINE/ GRASS	D.FIR/ W.FIR	WATERSHED BOUNDARY

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R8W R7W R6W

T34S

T35S

T36S

SCALE 1:140000

Map 6 SERAL STAGES ON BLM LANDS IN THE BIG HOG WATERSHED

LEGEND

- OLD GROWTH
- MATURE
- MID
- EARLY
- NOT APPLICABLE
- NON-BLM LAND
- WATERSHED BOUNDARY

N

August 1998

John McGlothlin

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R8W R7W R6W

T34S

T35S

T36S

SCALE 1:140000

Map 7 PLANT SERIES ON NON-USFS LANDS IN THE BIG HOG WATERSHED

LEGEND

- NON-VEG.
- NON-FOREST
- RIPARIAN HARDWOOD
- TANOAK
- TANOAK/ D.FIR
- W.OAK
- J.PINE
- P.PINE
- D.FIR/ PINE
- D.FIR
- D.FIR/ W.FIR
- W.FIR
- USFS LAND
- WATERSHED BOUNDARY

N

August 1998

John McGlothlin

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R8W R7W R6W

T34S

T35S

T36S

SCALE 1:140000

Map 8 VEGETATIVE CONDITION CLASS ON NON-USFS LANDS IN THE BIG HOG WATERSHED

LEGEND

- NON-VEG.
- DEVELOPED, NON-VEG.
- DEVELOPED, VEGETATED
- GRASS
- SHRUB
- HARDWOOD
- EARLY
- SEEDLING/ SAPLING
- POLES
- MID-SERAL
- MATURE
- USFS LAND
- WATERSHED BOUNDARY

N

August 1998

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R8W R7W R6W

T34S

T35S

T36S

SCALE 1:140000

Map 9 SPOTTED OWL HABITAT RATING ON NON-USFS LANDS IN THE BIG HOG WATERSHED

LEGEND

- NONVEG (Not Rated)
- (1) OPTIMAL
- (2) MEETS FORAGING, DISPERSAL, ROOSTING
- (3) MEETS NO REQUIREMENTS; HAS POTENTIAL TO BECOME 1 OR 2
- (4) MEETS NO REQUIREMENTS; NOT LIKELY TO BECOME 1 OR 2
- (5) DISPERSAL ONLY; HAS POTENTIAL TO BECOME 1 OR 2
- (6) DISPERSAL ONLY; NOT LIKELY TO BECOME 1 OR 2
- USFS LAND
- WATERSHED BOUNDARY

N

August 1998

John McGlothlin

SCALE 1:140000

Map 10 SUB-WATERSHEDS OF THE BIG HOG WATERSHED (BASED ON HUC6)

July 1996

John McGlothlin

LEGEND

ROGUE HOG WATERSHED BOUNDARY

SUB-WATERSHED BOUNDARY

N

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R8W R7W R6W

T34S

T35S

T36S

SCALE 1:140000

Map 11 STREAM ORDERS (> 2) ON NON-USFS LANDS IN THE BIG HOG WATERSHED

July 1998

John McGlothlin

LEGEND

ORDER 3

ORDER 4

ORDER 5+

BLM LAND

USFS LAND

N

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COHO

CHINOOK

Map 12

SCALE 1:270000

APPROXIMATE DISTRIBUTION OF COHO & CHINOOK SALMONIDS ON BLM & PRIVATE LANDS IN THE BIG HOG WATERSHED

LEGEND

WATERSHED BOUNDARY

DISTRIBUTION OF FISH

USFS LAND

N

July 1996

John McGlothlin

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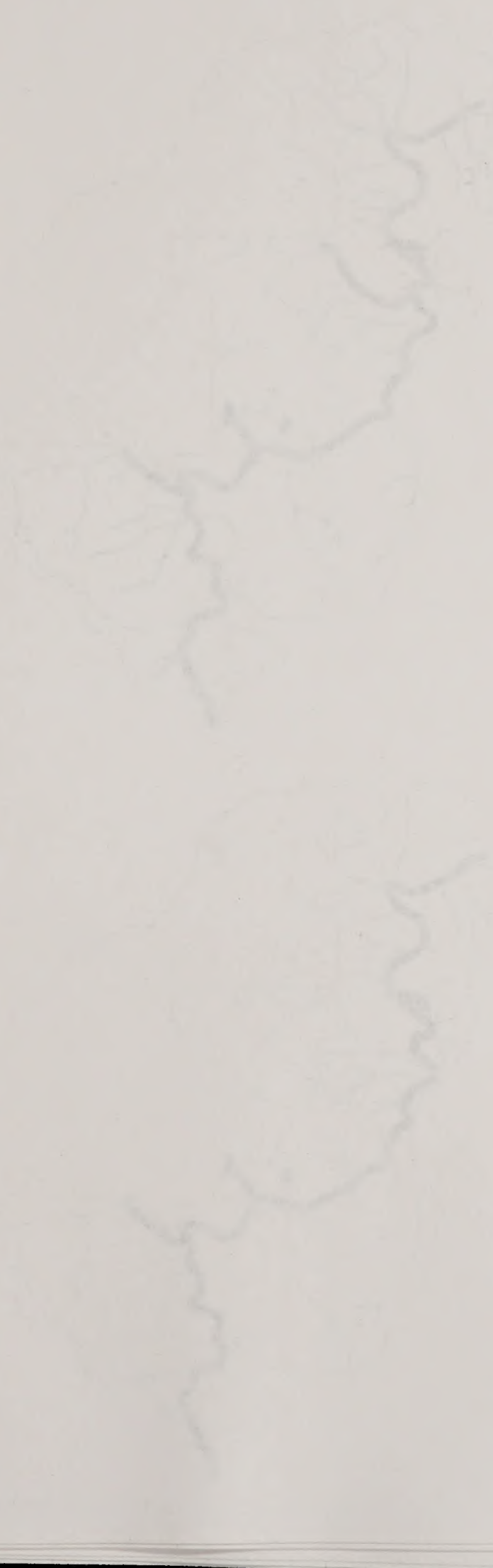

STEELHEAD

CUTTHROAT

Map 13

SCALE 1:270000

APPROXIMATE DISTRIBUTION OF STEELHEAD & CUTTHROAT SALMONIDS ON BLM & PRIVATE LANDS IN THE BIG HOG WATERSHED

LEGEND

WATERSHED BOUNDARY

DISTRIBUTION OF FISH

USFS LAND

N

July 1996

John McGlothlin

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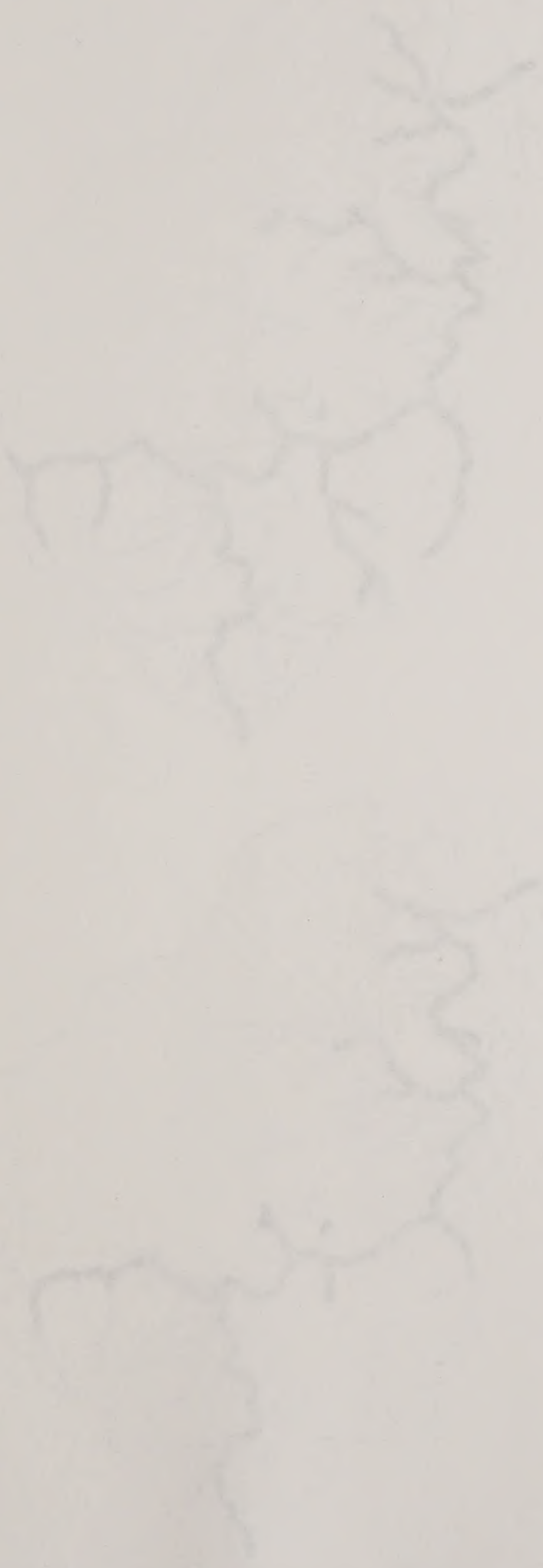

SCALE 1:140000

Map 14 MINERAL POTENTIAL IN THE BIG HOG WATERSHED

LEGEND

High Potential

Medium Potential

Low Potential

WATERSHED BOUNDARY

N

July 1996

John McGlothlin

No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual use or aggregate use with other data.

R8W R7W R6W

T34S

T35S

T36S

SCALE 1:140000

Map 15 FIRE HAZARD RATING FOR NON-USFS LANDS IN THE BIG HOG WATERSHED

LEGEND

HIGH

MEDIUM

LOW

USFS LAND

WATERSHED BOUNDARY

N

August 1998

John McGlothlin

R8W R7W R6W

T34S

T35S

T36S

SCALE 1:140000

Map 16 FIRE RISK RATING FOR NON-USFS LANDS IN THE BIG HOG WATERSHED

LEGEND

- HIGH
- MEDIUM
- LOW
- USFS LAND
- WATERSHED BOUNDARY

N

August 1998

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No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual use or aggregate use with other data.

R8W R7W R6W

T34S

T35S

T36S

SCALE 1:140000

Map 17 FUEL MODELS FOR NON-USFS LANDS IN THE BIG HOG WATERSHED

LEGEND

- GRASS AND GRASS DOMINATED
- CHAPARRAL AND SHRUB FIELDS
- TIMBER LITTER
- SLASH
- FUEL MODELING NOT APPLICABLE
- USFS LAND
- WATERSHED BOUNDARY

N

August 1998

John McGlothlin

No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual use or aggregate use with other data.

R8W R7W R6W

T34S

T35S

T36S

SCALE 1:140000

Map 18 FIRE VALUE RATING FOR NON-USFS LANDS IN THE BIG HOG WATERSHED

LEGEND

- HIGH
- MEDIUM
- LOW
- USFS LAND
- WATERSHED BOUNDARY

N

August 1998

John McGlothlin

No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual use or aggregate use with other data.

R8W R7W R6W

T34S

T35S

T36S

SCALE 1:140000

Map 19

POTENTIAL HIGH PRIORITY HAZARD REDUCTION TREATMENT AREAS ON NON-USFS LANDS IN THE BIG HOG WATERSHED

LEGEND

- Areas With High Ratings
- USFS LAND
- WATERSHED BOUNDARY

N

August 1998

John McGlothlin

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Appendix B: Mining Claim Information

A mining claimant/operator has the right to prospect and develop the mining claim as authorized through the General Mining Laws and amendments. Acceptable activities that normally occur on mining claims include the development of the mineral resources by extracting the gold bearing gravels, or ore, from the claim and manufacturing of the mineral materials utilizing a trommel and sluice box system, or a millsite of some sort. After the gold is extracted the tailings (waste material) are stockpiled to either be utilized in the reclamation of the site or removed to an appropriate location. Timber on site may be used in some situations if outlined in a mining notice or plan of operations.

The operator, or claimant, will be allowed to build structures and occupy the site where such uses are incidental to mining and approved in writing by the appropriate BLM authorized officer. The use and occupancy of a mining claim will be reviewed on a case-by-case basis to determine if such uses are incidental. A letter of concurrence will be issued only where the operator shows that the use or occupancy is incidental to mining; where substantially regular mining activity is occurring; and will be subject to the operator complying with all state, federal, and local governmental codes and regulations. This means that in addition to meeting the requirements to mine on a regular basis the claimant will need to meet the standards of the Oregon Uniform Building Codes and all state sanitation requirements.

The filing of mining claims gives the claimant the rights and ownership of the minerals beneath the surface of the lands encumbered by the mining claims. In most cases, management of the surface of the claims rests with the appropriate federal agency with jurisdiction.

The claimants/operators have the right to use that portion of the surface necessary in the development of the claim. In the cases where the surface of the claims are administered by the BLM or Forest Service the claimant/operator may, for safety or security reasons, limit the public access at the location of operations. Where there are no safety or security concerns the surface of the mining claims are open to the public.

In some instances the surface of the mining claim is managed by the claimant. These are usually claims that were filed before August 1955 and determined valid at that time. The claimants in these cases have the same rights as outlined above. However, they have the right to eliminate public access across that area where they have surface rights.

Appendix C: Road Information

1. Definitions

BLM Capitalized Roads: The BLM analyzes Bureau-controlled roads to determine capitalized or non-capitalized classification. During this analysis, the BLM considers many elements, including the present and future access needs, type of road, total investment and the road location, to reach a conclusion of classification of the road. Each capitalized road is identified with a BLM road number and a capitalized value. BLM capitalized roads are managed and controlled by the BLM.

BLM Non-Capitalized Roads and Skid Trails: BLM non-capitalized roads and skid trails are not assigned a capitalized value. Non-capitalized roads are generally jeep roads and spur roads that exist due to intermittent public and administrative use. Skid trails are ground disturbances, created under a timber sale, that have not been restored to their natural surrounding environment.

Non-BLM Roads and Skid Trails: Non-BLM roads and skid trails are administered by private landowners and\or other government agencies. The BLM has no control over these roads.

Quarries: Quarries are areas of land suitable for use as a rock source to develop aggregate material for the surfacing of roads, rip rap for slope protection, rock for stream enhancement projects and other miscellaneous uses. Examples of data elements for quarries: active quarry, depleted quarry.

Road Data Elements: Information on data elements is available through the Medford District road record files, right-of-way (R/W) agreement files, easement files, computer road inventory program, GIS maps, transportation maps, aerial photos and employee knowledge of existing road systems. When data gaps are determined to exist, field data will be gathered to eliminate the gaps and at the same time existing data element information will be verified. Some information on private roads does exist, but the majority will need to be researched by the BLM through privately-authorized field investigations and answers to BLM's request for information from private land. Examples of data elements for roads: road density, road surface, surface depth, road use, road drainage, road condition, road grade, gates, R/W agreements, easements, maintenance levels, and barricades.

2. Definition of Columns in Watershed Road Information Tables

T-R-Sec-Seg: T = Township R = Range Sec = Section Seg = Road Segment

These columns describe the road number, location of the beginning point of the road, and the road segment. Example of a road number: 35-7-24 A.

Name: Name of the road.

O&C: Length of road in miles that crosses O&C lands.

PD: Length of road in miles that crosses public domain lands.

Other: Length of road in miles that crosses other lands.

Total Miles: Total length of the road in miles.

Srf. Type: Road surface type. NAT- Natural, PRR- Pit Run, GRR- Grid Rolled, ABC- Aggregate Base Course, ASC- Aggregate Surface Course, BST- Bituminous Surface Treatment.

Sub. Wid: Subgrade width of the road in feet.

Srf. Dp: Road surfacing depth in inches.

Who Ctrls: Who controls the road: BLM = Bureau of Land Management, PVT = Private.

Cus. Mtn: BLM Custodial Maintenance Level. Level of maintenance needed during normal administrative use with no timber haul.

Opr. Mtn: BLM Operational Maintenance Level. Level of maintenance needed during active timber hauling.

BLM Maintenance Levels (Under Column for Cus. Mtn. and Opr. Mtn)

Level 1: This level is the minimal custodial care as required to protect the road investment, adjacent lands, and resource values. Normally, these roads are blocked and not open for traffic or are open only to restricted traffic. Traffic would be limited to use by high clearance vehicles. Passenger car traffic is not a consideration. Culverts, waterbars/dips and other drainage facilities are to be inspected on a three-year cycle and maintained as needed. Grading, brushing, or slide removal is not performed unless they affect roadbed drainage. Closure and traffic restrictive devices are maintained.

Level 2: This level is used on roads where management requires the road to be opened seasonally or for limited passage of traffic. Traffic is generally administrative with some moderate seasonal use. Typically these roads are passable by high clearance vehicles. Passenger cars are not recommended as user comfort and convenience and are not considered priorities. Culverts, waterbars/dips and other drainage facilities are to be inspected annually and maintained as needed. Grading is conducted as necessary only to correct drainage problems. Brushing is conducted as needed (generally on a three-year cycle) only to facilitate passage of maintenance equipment. Slides may be left in place provided that they do not affect drainage and there is at least 10 feet of usable roadway.

Level 3: This level is used on intermediate or constant service roads where traffic volume is significantly heavier approaching an average daily traffic of 15 vehicles. Typically, these roads are native or aggregate surfaced, but may include low use bituminous surfaced road. This level would be the typical level for log hauling. Passenger cars are capable of using most of these roads by traveling slow and avoiding obstacles that have fallen within the travelway. Culverts, waterbars/dips and other drainage facilities are to be inspected annually and maintained as needed. Grading is conducted annually to provide a reasonable level of riding comfort. Brushing is conducted annually or as needed to provide concern for driver safety. Slides affecting drainage would receive high priority for removal, otherwise they will be removed on a scheduled basis.

Level 4: This level is used on roads where management requires the road to be opened all year and have a moderate concern for driver safety and convenience. Traffic volume is approximately an average daily traffic of 15 vehicles and will accommodate passenger vehicles at moderate travel speeds. Typically, these roads are single lane bituminous surface, but may also include heavily-used aggregate surfaced roads as well. The entire roadway is maintained on an annual basis, although a preventative maintenance program may be established. Problems are repaired as soon as discovered.

Level 5: This level is used on roads where management requires the road to be opened all year and have a high concern for driver safety and convenience. Traffic volume exceeds an average daily traffic of 15. Typically, these roads are double or single lane bituminous, but may also include heavily used aggregate surfaced roads as well. The entire roadway is maintained on an annual basis and a preventative maintenance program is also established. Brushing may be conducted twice a year as necessary. Problems are repaired as soon as discovered.

Who Mtn: This column changes based on who's responsible for maintaining the road. BLM- Bureau of Land Management, PVT- Private, TSO- Timber Sale Operator, or Other.

Comments: Comments pertaining to each road.

Table C-1: Rogue - Recreation Watershed Road Information

T.	R.	Sec.	Seg.	Name	O&C	PD	Other	Total Miles	Srf. Typ	Sub. Wid.	Srf. Dp.	Who Ctrls.	Cus. Mtn.	Opr. Mtn.	Who Mtn.	Road Standard
34S	7W	3.01	F	McKnabe Creel	2.02	0	0	2.02	GRR	15	6	BL	3	3	BLM	SL
34S	7W	7.01	--	McKnabe H sp	1	0	0	1	GRR	16	6	BL	3	3	BLM	SL
34S	7W	8.00	--	Centennial Gulch	0.5	0.5	0	1	NAT	14		BL	1	1	OTR	SL
34S	7W	15.1	--	G Spur	0.26	0	0	0.26	PRR	16	6	BL	3	3	BLM	SL
34S	7W	15.3	--	Angora X sp	0.41	0	0	0.41	PRR	16	6	BL	3	3	BLM	SL
34S	7W	21.0	--	Upper Stratton sp	0.67	0	0	0.67	GRR	14	6	BL	3	3	BLM	SL
34S	7W	21.1	--	Hog Butte a sp	0.22	0	0	0.22	GRR	14	6	BL	3	3	BLM	SL
34S	7W	21.2	--	Hog Butte B sp	0.43	0	0	0.43	GRR	14	6	BL	3	3	BLM	SL
34S	7W	21.3	--	Hog Butte C sp	0.54	0	0	0.54	GRR	14	6	BL	3	3	BLM	SL
34S	7W	21.4	--	Hog Butte D sp	0.26	0	0	0.26	PRR	14	6	BL	3	3	BLM	SL
34S	7W	21.6	A	Upper Stratton sp	0.04	0	0.96	1	ASC	16	8	PB	3	3	PVT	SL
34S	7W	21.6	B	Upper Stratton sp	0.52	0	0.3	0.82	ASC	16	8	BL	3	3	PVT	SL
34S	7W	21.6	C	Upper Stratton sp	1.05	0	0	1.05	PRR	16	8	BL	3	3	BLM	SL
34S	7W	22.0	A	Hog Butte S sp	0	0	0.1	0.1	ASC	14	6	BL	3	3	OTR	SL
34S	7W	22.0	B	Hog Butte S Spur	0.19	0	0	0.19	GRR	14	8	BL	3	3	BLM	SL
34S	7W	22.0	C	Hog Butte S sp	2.27	0	0	2.27	GRR	14	8	BL	3	3	BLM	SL
34S	7W	22.0	D	Hog Butte S Spur	0.27	0	0	0.27	GRR	14	8	BL	3	3	BLM	SL
34S	7W	22.1	A	Upper Stratton H sp	0	0	0.23	0.23	GRR	14	6	PV	3	3	OTR	SL
34S	7W	22.1	B	Upper Stratton H sp	0.05	0	0	0.05	GRR	14	6	BL	3	3	BLM	SL
34S	7W	22.1	C	Upper Stratton H sp	0	0	0.15	0.15	GRR	14	6	PV	3	3	OTR	SL
34S	7W	22.1	D	Upper Stratton H sp	0.13	0	0	0.13	GRR	14	6	BL	3	3	BLM	SL
34S	7W	22.2	--	Upper Stratton G sp	0	0	0.2	0.2	NAT	14		PV	1	1	BLM	SL

Table C-1: Rogue - Recreation Watershed Road Information

T.	R.	Sec.	Seg.	Name	O&C	PD	Other	Total Miles	Srf. Typ	Sub. Wid.	Srf. Dp.	Who Ctrls.	Cus. Mtn.	Opr. Mtn.	Who Mtn.	Road Standard
34S	7W	23.2	--	New Hog Ck. Ridge Sp.	0.14	0	0	0.14	GRR	16	8	BL	3	3	BLM	SL
34S	7W	26.1	A	Hog Creek Spur 3	0.05	0	0.16	0.21	ABC	14	4	BL	3	3	BLM	SL
34S	7W	26.1	B	Hog Creek Spur 3	0.6	0	0	0.6	GRR	16	6	PB	3	3	BLM	SL
34S	7W	26.1	C1	Hog Creek Spur 3	0	0	0.88	0.88	GRR	16	8	NE	3	3	BLM	SL
34S	7W	26.1	C2	Hog Creek Spur 3	0	0	0.71	0.71	NAT	16		NE	2	2	BLM	SL
34S	7W	26.1	D	Hog Creek Spur 3	0.14	0	0	0.14	NAT	16		PV	2	2	BLM	SL
34S	7W	27.0	--	Hog Divide Sp.	0.39	0	0	0.39	ABC	16	5	BL	3	3	BLM	SL
34S	7W	27.1	--	Hog Slide	1.64	0	0.05	1.69	PRR	14	6	BL	3	3	BLM	SL
34S	7W	27.2	--	Hog Slide sp	0.38	0	0	0.38	PRR	16	5	BL	3	3	BLM	SL
34S	7W	27.3	--	Hog Creek Sp3	0.9	0	0	0.9	PRR	16	5	BL	3	3	BLM	SL
34S	7W	29.0	--	Stratton Peak	0.2	0	0	0.2	GRR	18	8	BL	1	1	DEF	SL
34S	7W	29.1	--	Stratton Ridge	0.38	0	0	0.38	GRR	16	8	BL	1	1	DEF	SL
34S	7W	33.0	A	Stratton Creek P sp	1.69	0	0	1.69	ASC	16	8	BL	3	3	BLM	SL
34S	7W	33.0	B	Stratton Creek P sp	0.13	0	0	0.13	NAT	16		BL	2	2	BLM	SL
34S	7W	33.1	--	Stratton Creek A sp	0.57	0	0	0.57	NAT	15		BL	2	2	BLM	SL
34S	7W	33.2	--	Stratton Creek B sp	0.35	0.11	0	0.46	NAT	16		BL	2	2	BLM	SL
34S	7W	33.3	--	Stratton Creek S2 sp	0.27	0	0	0.27	NAT	16		BL	2	2	BLM	SL
34S	7W	33.4	--	Stratton Creek C sp	0.28	0	0	0.28	PRR	16	6	BL	3	3	BLM	SL
34S	7W	34.0	--	Hog Stratton Sp2	0.4	0	0.17	0.57	GRR	14	8	BL	3	3	BLM	SL
34S	7W	35.0	--	Hog Stratton Sp1	0.13	0	0	0.13	GRR	16	8	BL	3	3	BLM	SL
34S	7W	35.1	A	Hog Creek Sp1	1.13	0	0	1.13	ABC	14	4	BL	3	3	BLM	SL
34S	7W	35.1	B	Hog Creek Sp 1	0.42	0	0	0.42	ABC	14	5	BL	3	3	BLM	SL

Table C-1: Rogue - Recreation Watershed Road Information

T.	R.	Sec.	Seg.	Name	O&C	PD	Other	Total Miles	Srf. Typ	Sub. Wid.	Srf. Dp.	Who Ctrls.	Cus. Mtn.	Opr. Mtn.	Who Mtn.	Road Standard
34S	7W	35.2	A	Hog Creek Sp 2	0.59	0	0	0.59	ABC	10	4	BL	3	3	BLM	SL
34S	7W	35.2	B	Hog Creek Sp 2	0.24	0	0	0.24	ABC	10	4	BL	3	3	BLM	SL
34S	7W	35.3	--	Lloyd sp	0.21	0	0	0.21	GRR	16	8	BL	3	3	BLM	SL
34S	7W	36.0	G1	Old Hog Creek Ridge	0.49	0	0.28	0.77	NAT	12		PV	2	2	PVT	SL
34S	7W	36.0	G2	Old Hog Creek Ridge	0.3	0	0	0.3	GRR	16	6	PV	3	3	BLM	SL
34S	7W	36.0	H	Old Hog Creek Ridge	0.27	0	1.17	1.44	NAT	16		PV	2	2	DEF	SL
34S	7W	36.0	I	Old Hog Creek Ridge	0.32	0	0	0.32	PRR	16	6	BL	3	3	DEF	SL
34S	7W	36.0	J	Old Hog Creek Ridge	0.17	0	0	0.17	NAT	16		BL	2	2	DEF	SL
34S	7W	36.0	L	Old Hog Creek Ridge	0	0	1.62	1.62	NAT	14		PV	2	2	PVT	SL
34S	7W	36.0	M	Old Hog Creek Ridge	0.6	0	0	0.6	NAT	14		BL	2	2	PVT	SL
34S	7W	36.0	N	Old Hog Creek Ridge	0	0	0.57	0.57	NAT	14		BL	2	2	PVT	SL
34S	7W	36.0	O	Old Hog Creek Ridge	1.21	0.29	0	1.5	NAT	14		BL	2	2	PVT	SL
34S	7W	36.1	A	Hog Creek sp	0	0	1.5	1.5	NAT	14		PV	2	2	PVT	SL
34S	7W	36.1	B	Hog Creek sp	0.8	0	0	0.8	NAT	16		PV	2	2	PVT	SL
34S	8W	10.0	B	Smith Creek	0.45	0	0	0.45	NAT	16		BL	2	2	BLM	SL
34S	8W	10.6	--	Boomer	0.41	0	0	0.41	ASC	16	8	BL	3	3	BLM	SL
34S	8W	13.0	--	Almeda	3.5	0	0	3.5	BST	18	6	BL	5	5	BLM	SA
34S	8W	15.0	A	W. Rum Creek	2.9	0	0	2.9	ABC	16	6	BL	3	3	BLM	SC
34S	8W	21.0	--	Peavine Lookout	0.38	0	0	0.38	ABC	16	6	BL	3	3	BLM	SL
34S	8W	21.1	--	Peavine A sp	0.37	0	0	0.37	ABC	16	6	BL	2	3	BLM	SL
34S	8W	21.3	--	Peavine C sp	0.17	0	0	0.17	ABC	16	6	BL	3	3	BLM	SL
34S	8W	21.4	--	Dave sp	0.21	0	0	0.21	ABC	16	6	BL	2	3	BLM	SL

Table C-1: Rogue - Recreation Watershed Road Information

T.	R.	Sec.	Seg.	Name	O&C	PD	Other	Total Miles	Srf. Typ	Sub. Wid.	Srf. Dp.	Who Ctrls.	Cus. Mtn.	Opr. Mtn.	Who Mtn.	Road Standard
34S	8W	21.5	--	Peavine D sp	0.06	0	0	0.06	ABC	16	6	BL	2	3	BLM	SL
34S	8W	21.6	--	Peavine E sp	0.16	0	0	0.16	ABC	16	6	BL	2	3	BLM	SL
34S	8W	22.0	--	Jonas Cabin	0.3	0	0	0.3	NAT	14		BL	2	3	BLM	SL
34S	8W	22.1	A	North Ridge	0.49	0	0	0.49	NAT	16		BL	2	3	BLM	SL
34S	8W	22.1	B	North Ridge	0.79	0	0	0.79	ABC	16	6	BL	2	3	BLM	SL
34S	8W	22.1	C	North Ridge	0.3	0	0	0.3	NAT	17		BL	2	3	BLM	SL
34S	8W	22.2	--	Bailey Creek	2.55	0	0	2.55	PRR	16	8	BL	2	3	BLM	SL
34S	8W	22.3	--	Rocky Gulch	0.56	0	0	0.56	NAT	18		BL	2	3	BLM	SL
34S	8W	22.4	--	N Rum Creek sp	1.02	0	0	1.02	ASC	14	6	BL	2	3	BLM	SL
34S	8W	24.0	--	Rand Boat Ramp Access	0.34	0	0	0.34	ASC	14		BL	2	3		SL
34S	8W	25.0	--	Golden Wedge Mine	2.8	0	0	2.8	NAT	14		BL	2	3		SL
34S	8W	27.0	A	Peggler Butte	1	0	0	1	BST	16	6	BL	4	4	BLM	SC
34S	8W	27.0	B	Peggler Butte	3.57	0	0	3.57	PRR	16	8	BL	2	3	BLM	SL
34S	8W	27.1	--	Median	1.2	0	0	1.2	NAT	16		BL	2	3	TSO	SL
34S	8W	28.0	--	Mt Peavine	1.58	0	0	1.58	ABC	16	8	BL	3	3	BLM	SC
34S	8W	28.1	--	Denise sp	0.61	0	0	0.61	ABC	16	6	BL	2	3	BLM	SL
34S	8W	29.0	--	Mill Creek sp	0.5	0	0	0.5	NAT	14		BL	2	3	BLM	SL
34S	8W	33.0	--	Blanchard Gulch	0.65	0	0	0.65	PRR	14	6	BL	2	3	BLM	SL
34S	8W	33.1	--	Peggler sp	0.3	0	0	0.3	NAT	16		BL	2	3	BLM	SL
34S	8W	34.0	A	Rum Creek	4.16	0	0	4.16	ASC	16	9	BL	3	3	BLM	SC
34S	8W	34.0	B	Rum Creek	1.7	0	0	1.7	ASC	16	8	BL	2	3	BLM	SC
34S	8W	34.1	--	Peavine Mining sp	1.17	0	0	1.17	NAT	16		BL	2	3	BLM	SL

Table C-1: Rogue - Recreation Watershed Road Information

T.	R.	Sec.	Seg.	Name	O&C	PD	Other	Total Miles	Srf. Typ	Sub. Wid.	Srf. Dp.	Who Ctrls.	Cus. Mtn.	Opr. Mtn.	Who Mtn.	Road Standard
34S	8W	34.2	--	Blanchard Glen	4	0	0	4	PRR	14		BL	2	3	BLM	SL
34S	8W	34.3	--	Blanchard Gulch B sp	0.8	0	0	0.8	PRR	16	6	BL	2	3	BLM	SL
34S	8W	34.4	--	Blanchard Gulch C sp	1	0	0	1	PRR	16	6	BL	2	3	BLM	SL
34S	8W	35.0	--	Black Bear Mine	1.14	0	0.1	1.24	NAT	14		PV	2	2	OTR	SL
34S	8W	36.0	A1	Galice Access A	0.72	0	0	0.72	BST	18	8	BL	5	5	BLM	SA
34S	8W	36.0	A2	Galice Access A	9.03	0	0	9.03	BST	18	8	BL	5	5	BLM	SA
34S	8W	36.2	--	Oriole Mine	1.61	0	0	1.61	PRR	14		BL	2	3	OTR	SL
35S	6W	8.0	E	Quartz Creek	0.58	0	0	0.58	GRR	14	8	BL	3	3	BLM	
35S	7W	01.0	A	Brockman Ridge A sp	1.6	0	0	1.6	NAT	14		BL	2	2	BLM	SL
35S	7W	01.2	--	Brockman Ridge B sp	0.86	0	0	0.86	NAT	14		BL	2	2	BLM	SL
35S	7W	01.4	--	Brockman Ridge sp	0.36	0	0	0.36	NAT	14		BL	2	2	BLM	SL
35S	7W	01.5	--	Brockman Ridge Jeep	1.14	0	0	1.14	NAT	12		BL	2	3	BLM	SL
35S	7W	03.0	--	Hog Stratton	0.15	0	0	0.15	NAT	14		BL	2	2	BLM	SL
35S	7W	04.0	--	Hellgate Bridge	0	0.19	0	0.19	BST	30		BL	5	5	BLM	SA
35S	7W	04.1	A	Lower Stratton Creek	0	0.65	0.59	1.24	ASC	16	4	BL	4	4	BLM	SC
35S	7W	04.1	B	Lower Stratton Creek	0.83	0	0.37	1.2	ASC	16	4	BL	3	3	BLM	SC
35S	7W	04.1	C	Lower Stratton Creek	0.34	0	0.51	0.85	ASC	16	4	BL	3	3	BLM	SL
35S	7W	04.1	D	Lower Stratton Creek	0	0	0.08	0.08	ASC	16	4	PV	3	3	OTR	SL
35S	7W	4.1	E	Lower Stratton Creek	0.63	0	0.03	0.66	ASC	16	4	BL	3	3	BLM	SL
35S	7W	4.2	A	Maple Gulch	0	0	0.05	0.05	NAT	16		BL	2	2	TSO	SL
35S	7W	4.2	B	Maple Gulch	0.48	0	0	0.48	NAT	16		BL	2	2	DEF	SL
35S	7W	4.2	C	Maple Gulch	0	0	0.1	0.1	NAT	16		OT	2	3	OTR	SL

Table C-1: Rogue - Recreation Watershed Road Information

T.	R.	Sec.	Seg.	Name	O&C	PD	Other	Total Miles	Srf. Typ	Sub. Wid.	Srf. Dp.	Who Ctrls.	Cus. Mtn.	Opr. Mtn.	Who Mtn.	Road Standard
35S	7W	4.2	D	Maple Gulch	1.43	0	0	1.43	NAT	16		BL	2	2	DEF	SL
35S	7W	04.2	E	Maple Gulch	0	0	0.19	0.19	NAT	16		PV	2	3	OTR	SL
35S	7 W	4.2	F	Maple Gulch												
35S	7W	4.2	G	Maple Gulch	0	0	0.08	0.08	NAT	16		PV	2	3	OTR	SL
35S	7W	4.2	H	Maple Gulch	0.51	0	0	0.51	NAT	16		BL	2	2	DEF	SL
35S	7W	4.2	I	Maple Gulch	0	0	0.75	0.75	NAT	16		PV	2	3	OTR	SL
35S	7W	4.2	J	Maple Gulch	0	0	2.48	2.48	NAT	16		PV	2	3	OTR	SL
35S	7W	4.2	K	Maple Gulch	0	0	0.78	0.78	NAT	16		OT	2	3	OTR	SL
35S	7W	4.2	L	Maple Gulch	0.52	0	0	0.52	NAT	16		BL	2	2	DEF	SL
35S	7W	5.0	--	Tharp	0.52	0	0	0.52	NAT	14		BL	2	2	TSO	SL
35S	7W	5.1	A	Ken Heap	0.17	0	0	0.17	PRR	14	6	BL	2	2	BLM	SL
35S	7W	7.0	--	Taylor Creek sp	0.4	0	0	0.4	NAT	16		BL	2	2	MUL	SL
35S	7W	11.0	A	Hog Creek	1.01	0	0	1.01	BST	14	8	BL	4	4	BLM	SA
35S	7W	11.0	B	Hog Creek	3.57	0	0	3.57	BST	14	8	BL	4	4	BLM	SA
35S	7W	11.0	C	Hog Creek	2.27	0	0	2.27	BST	14	4	BL	4	4	BLM	SA
35S	7W	11.0	D	Hog Creek	0.18	0	0	0.18	BST	14	4	BL	4	4	BLM	SA
35S	7W	11.0	E	Hog Creek	0.38	0	0.72	1.1	ASC	14	4	PV	4	4	OTR	SA
35S	7W	11.0	F	Hog Creek	0.69	0	0	0.69	ASC	14	4	BL	4	4	BLM	SA
35S	7W	11.1	A	Brockman Ridge	1.53	0	0.14	1.67	ABC	14	8	BL	3	3	BLM	SC
35S	7W	11.1	B	Brockman Ridge	0.55	0	0	0.55	ABC	14	8	BL	3	3	BLM	SC
35S	7W	11.1	C	Brockman Ridge	0.64	0	0	0.64	ABC	14	8	BL	3	3	BLM	SL
35S	7W	15.0	A	Buckhorn Mountain	0.09	0	0	0.09	NAT	14		PV	2	2	BLM	SL

Table C-1: Rogue - Recreation Watershed Road Information

T.	R.	Sec.	Seg.	Name	O&C	PD	Other	Total Miles	Srf. Typ	Sub. Wid.	Srf. Dp.	Who Ctrls.	Cus. Mtn.	Opr. Mtn.	Who Mtn.	Road Standard
35S	7W	15.0	B	Buckhorn Mountain	0	0	0.07	0.07	NAT	14		OT	2	2	OTR	SL
35S	7W	15.0	C	Buckhorn Mountain	0.08	0	0	0.08	NAT	14		BL	2	2	BLM	SL
35S	7W	15.0	D	Buckhorn Mountain	0	0	1.88	1.88	NAT	14		OT	2	2	OTR	SL
35S	7W	15.0	E	Buckhorn Mountain	0.38	0	0	0.38	NAT	14		BL	2	2	BLM	SL
35S	7W	20.0	A	Pickett Creek D sp	0	0.55	0	0.55	GRR	16	8	BL	3	3	BLM	SL
35S	7W	20.0	B	Pickett Creek D sp	0	0.31	0	0.31	NAT	12		BL	2	2	BLM	SL
35S	7W	20.0	C	Pickett Creek D sp	0	0	0.08	0.08	NAT	12		OT	2	2	OTR	SL
35S	7W	20.0	D	Pickett Creek D sp	0	0.2	0	0.2	NAT	12		BL	2	2	BLM	SL
35S	7W	20.0	E	Pickett Creek D sp	0	0	0.29	0.29	NAT	12		PV	2	2	OTR	SL
35S	7W	20.0	F	Pickett Creek D sp	0.18	0	0	0.18	NAT	12		BL	2	2	BLM	SL
35S	7W	22.0	--	Little Pickett Creek A sp	0.37	0	0	0.37	NAT	16		BL	2	2	BLM	SL
35S	7W	22.1	--	Little Pickett Creek B sp	1.53	0	0	1.53	NAT	14		BL	2	2	BLM	SL
35S	7W	27.0	A	W Pickett Creek ml	0.38	0	0.42	0.8	ASC	14	4	BL	4	4	BLM	SC
35S	7W	27.0	B	W Pickett Creek ml	0.18	0	0.52	0.7	ASC	14	4	BL	4	4	BLM	SC
35S	7W	27.0	C	W Pickett Creek ml	1.06	0	0	1.06	ASC	14	4	BL	4	4	BLM	SC
35S	7W	27.0	D	W Pickett Creek ml	0.9	0	0.4	1.3	ASC	14	4	BL	3	3	BLM	SC
35S	7W	27.0	E	W Pickett Creek ml	0.76	0	0	0.76	ASC	14	4	BL	3	3	BLM	SC
35S	7W	27.0	F	W Pickett Creek ml	1.36	0	0.27	1.63	GRR	14	6	BL	3	3	BLM	SL
35S	7W	27.1	--	W Pickett Creel sp	1.31	0	0	1.31	PRR	14	6	BL	3	3	BLM	SL
35S	7W	27.2	--	Panther Gulch Sp2	0.74	0.11	0	0.85	PRR	14	6	BL	3	3	BLM	SL
35S	7W	27.3	A	Little Pickett P Line	0.6	0	0	0.6	GRR	14	6	BL	3	3	BLM	SC
35S	7W	27.3	B	Little Pickett P Line	1.08	1.47	0	2.55	NAT	14		BL	2	2	BLM	SL

Table C-1: Rogue - Recreation Watershed Road Information

T.	R.	Sec.	Seg.	Name	O&C	PD	Other	Total Miles	Srf. Typ	Sub. Wid.	Srf. Dp.	Who Ctrls.	Cus. Mtn.	Opr. Mtn.	Who Mtn.	Road Standard
35S	7W	27.4	--	Panther Gulch Sp 4	0.66	0	0	0.66	NAT	14	8	BL	2	2	BLM	SL
35S	7W	27.5	A	Max Schwab Mem Hw	0.07	0	0	0.07	GRR	17	6	BL	3	3	BLM	SL
35S	7W	27.5	B	Max Schwab Mem Hw	0.2	0	0	0.2	NAT	14		BL	2	2	BLM	SL
35S	7W	27.6	--	Pickett Creek A1 sp	0.22	0	0	0.22	GRR	16	8	BL	3	3	BLM	SL
35S	7W	27.7	--	Panther Gulch sp	0.48	0.24	0	0.72	GRR	14	8	BL	3	3	BLM	SL
35S	7W	28.0	A	Buckhorn Mountain B sp	0.6	0	0.1	0.7	ASC	14	4	BL	3	3	BLM	SL
35S	7W	28.0	B	Buckhorn Mountain B sp	0.59	0.07	0	0.66	GRR	14	6	BL	3	3	BLM	SL
35S	7W	28.0	C	Buckhorn Mountain B sp	0	0.25	0	0.25	GRR	16	6	BL	3	3	BLM	SL
35S	7W	29.0	A	Buckhorn Mountain	0.75	0	0.2	0.95	ASC	14	4	BL	3	3	BLM	SC
35S	7W	29.0	B	Buckhorn Mountain	0.14	0	0.12	0.26	PRR	14	6	BL	3	3	BLM	SL
35S	7W	29.1	--	Buckhorn Mtn B1 sp	0.65	0.17	0	0.82	PRR	16	6	BL	3	3	BLM	SL
35S	7W	29.2	--	Buckhorn Mtn B3 sp	0.48	0	0	0.48	NAT	17		BL	2	2	BLM	SL
35S	7W	29.3	--	W Pickett Creek P1 sp	0.45	0	0	0.45	PRR	17		BL	2	2	BLM	SL
35S	7W	29.4	--	W Pickett Creek P2 sp	0.41	0	0	0.41	GRR	16	6	BL	3	3	BLM	SL
35S	7W	29.5	--	W Pickett Creek sp	0.21	0	0	0.21	GRR	16	6	BL	3	3	BLM	SL
35S	7W	29.6	--	Buckhorn Mountain sp	0.14	0	0	0.14	GRR	16	6	BL	3	3	BLM	SL
35S	7W	31.0	--	W Pickett Creek P3 sp	0.3	0	0	0.3	GRR	17	8	BL	3	3	BLM	SL
35S	7W	33.0	--	W Pickett Creek Sp2	0.4	0	0	0.4	NAT	17		BL	2	2	BLM	SL
35S	7W	33.1	A	W Pickett Creek A sp	0.77	0	0	0.77	PRR	14	8	BL	3	3	BLM	SL
35S	7W	33.1	B	W Pickett Creek A sp	1.18	0.56	0	1.74	PRR	14	6	BL	3	3	BLM	SL
35S	7W	33.1	C	W Pickett Creek A sp	0.61	0	0	0.61	GRR	14	8	BL	3	3	BLM	SL
35S	7W	33.2	--	W Pickett Creek sp	0	0.46	0	0.46	GRR	14	8	BL	3	3	BLM	SL

Table C-1: Rogue - Recreation Watershed Road Information

T.	R.	Sec.	Seg.	Name	O&C	PD	Other	Total Miles	Srf. Typ	Sub. Wid.	Srf. Dp.	Who Ctrls.	Cus. Mtn.	Opr. Mtn.	Who Mtn.	Road Standard
35S	7W	33.3	--	Pickett Creek sp	0.39	0	0	0.39	GRR	14	8	BL	3	3	BLM	SL
35S	7W	33.4	--	Pickett Creek sp	1.13	0	0	1.13	GRR	14	8	BL	3	3	BLM	SL
35 S	8W	02.00	A1	Peavine	1.63	0	0	1.63	BST	16	6	BL	4	4	BLM	SA
35 S	8W	02.00	A2	Peavine	1.27	0	0	1.27	BST	16	6	BL	4	4	BLM	SA
35 S	8W	02.00	B	Peavine	1.2	0	0	1.2	BST	16	6	BL	4	4	BLM	SA
35 S	8W	02.00	C	Peavine	2.4	0	0	2.4	BST	16	6	BL	4	4	BLM	SA
35 S	8W	02.00	D	Peavine	1.1	0	0	1.1	NAT	16		BL	2	3	TSO	SL
35 S	8W	02.00	E	Peavine	1.1	0	0	1.1	NAT	16		BL	2	2	BLM	SL
35 S	8W	05.00	--	Mill Creek	3.1	0	0	3.1	NAT	14		BL	2	3	BLM	SL
35 S	8W	06.00	--	Hansen Creek	2.4	0	0	2.4	NAT	16		BL	2	3	BLM	SL
35 S	8W	06.01	--	North Fork A sp	1	0	0	1	NAT	16		BL	2	2	BLM	SL
35 S	8W	07.00	--	N. Fork Galice Creek	2.2	0	0	2.2	NAT	14		BL	2	2	BLM	SL
35S	9W	1.2	A	Serpentine Spring	2.7	0	0	2.7	GRR	16	6	BL	2	3	BLM	SL
35S	9W	1.2	B	Serpentine Spring	2.58	0	0	2.58	GRR	16	6	BL	2	3	BLM	SL
35S	9W	1.2	C	Serpentine Spring	0.25	0	0	0.25	ABC	16	6	BL	2	3	BLM	SL
35S	9W	1.4	A	Hansen Saddle	1.88	0	0	1.88	ABC	14	6	BL	3	3	BLM	SL
35S	9W	1.4	B	Hansen Saddle	0.52	0	0	0.52	GRR	14	12	BL	3	3	BLM	SL
35S	9W	12.0	A	Chrome Ridge	0.5	0	0	0.5	NAT	14		BL	3	3	BLM	SL
35S	9W	12.0	B	Chrome Ridge	1.7	0	0	1.7	PRR	14	6	BL	3	3	BLM	SL
35S	9W	12.1	--	Hansen Saddle B sp	0.45	0	0	0.45	NAT	16		BL	3	3	BLM	SL
35S	9W	12.5	--	Hansen Mountain	1.42	0	0	1.42	NAT	17		BL	1	2	BLM	SL
36S	7W	2.00	--	Flanagan Slough	0	0.8	0	0.8	NAT	16		BL	2	3	BLM	SL

Table C-1: Rogue - Recreation Watershed Road Information

T.	R.	Sec.	Seg.	Name	O&C	PD	Other	Total Miles	Srf. Typ	Sub. Wid.	Srf. Dp.	Who Ctrls.	Cus. Mtn.	Opr. Mtn.	Who Mtn.	Road Standard
36S	7W	3.00	A	Ogden Heights	0.09	0.17	0	0.26	NAT	10		BL	2	3	BLM	SL
36S	7W	3.00	B	Ogden Heights	0.61	0	0	0.61	NAT	10		BL	2	3	BLM	SL
36S	7W	22.0	A	Blue Gulch	0.75	0	0.14	0.89	NAT	16		BL	2	2	TSO	SC
36S	7W	22.0	B	Blue Gulch	0.21	0	0.59	0.8	NAT	16		BL	2	2	TSO	SC
36S	7W	22.0	C	Blue Gulch	1.1	0	0	1.1	NAT	16		BL	2	2	TSO	SL
36S	7W	22.0	D	Blue Gulch	1.81	0	0	1.81	NAT	14		BL	2	2	BLM	SL
36S	7W	23.0	--	Blue Gulch 80	0.92	0	0	0.92	PRR	14	6	BL	3	3	TSO	SL
36S	7W	25.0	--	Cricket	0.73	0	0.11	0.84	NAT	14		BL	2	2	TSO	SL
36S	7W	27.0	--	Blue Gulch sp	2.59	0	0	2.59	NAT	14		BL	2	2	TSO	SL
36S	7W	27.1	--	Blue Gulch	0.18	0	0	0.18	NAT	14		BL	2	2	BLM	SL
36S	7W	27.2	--	Blue Gulch sp	0.93	0	0	0.93	NAT	14		BL	2	2	TSO	SL
36S	7W	27.3	--	Blue Gulch sp	0.07	0	0	0.07	NAT	14		BL	2	2	BLM	SL

Appendix D: Wildlife Information

Table D-1: Spotted Owl Sites Located within the Watershed

Site Name	Level of Protection
Hog Creek	100 acre core has been established
Graves Bridge	100 acre core has been established
Centennial	100 acre core has been established
Almeda	100 acre core has been established
Stratton on Ash	100 acre core has been established
Stratton Creek	100 acre core has been established
Log Cabin	Located after January 1 1994; does not receive a core
North Buckhorn	100 acre core has been established
Pickett Creek	100 acre core has been established
Bailey Creek	Located in the Late-Successional Reserve
Rocky Gulch	Located in the Late-Successional Reserve
Jelly Roll	Located in the Late-Successional Reserve
Peggler Mill	Located in the Late-Successional Reserve
North Galice Creek	Located in the Late-Successional Reserve

Table D-2: Spotted Owl Sites Located Outside the Watershed with Provincial Home Range Falling within the Watershed.

Site Name	Level of Protection
Rum Creek	3386
Butte Creek	0923
McKnabe	0951

Table D-3: Spotted Owl Habitat Availability for Known Sites as of 1997			
Site Name	**Msno**	**Bureau Administered Habitat within 1.3 Miles (Acres)**	**Percent Suitable within 1.3 Miles**
Hog Creek	0941	130	3.8%
Graves Bridge	3388	258	7.7%
Centennial	0970	513	15%
Almeda	3945	430	13%
Stratton on Ash	3387	235	7%
Stratton Creek	0915	137	4%
Log Cabin	8133	319	9.5%
North Buckhorn	0918	353	10.2%
Pickett Creek	0055	125	3.7%
Bailey Creek	3283	2237	64%
Rocky Gulch	2635	2080	60%
Jelly Roll	4408	683	19.6%
Peggler Mill	0946	1708	49%
North Galice Creek	0918	706	20%

* Habitat available as of 1/9/99

Table D-4: Results of NSO Nesting Surveys in the Rogue - Recreation Watershed

Site Name	87	88	89	90	91	92	93	94	95	96	97
Almeda	SU	SU	SU	SU	SU	SU	SU	S	NS	NS	S
Bailey Creek	SU	SU	SU	SU	SU	P/1	P/1	SNB	P	P/2	NS
Centennial	P	P	SNB	P	P/0	S	S	P/2	P	P/1	P/2
Graves Bridge	SU	SU	SU	SU	SU	S	SNB	NS	NS	NS	SI
Hog Creek	X	X	X	X	X	S	X	NS	S	NS	SI
Jelly Roll	SU	SU	SU	SU	SU	SU	SU	SU	NS	S	NS
Log Cabin	SU	SU	SU	SU	SU	SU	SU	SU	SU	P	S
North Buckhorn	SNB	NS	NS	SNB	S	S	SNB	NS	NS	NS	SI
North Galice Creek	SNB	NS	NS	P/2	P	P/0	P	S	P	P	NS
Peggler Mill	S	S	P	P/2	P/1	P/2	P/2	P/2	P	P/1	NS
Pickett Creek	SNB	SNB	SNB	SNB	SNB	SNB	SNB	NS	NS	NS	SI
Rocky Gulch	NS	NS	NS	NS	P	P	P	P/2	SNB	P	NS
Stratton Creek	SNB	SNB	S	S	S	P	P	P	P/2	P/1	P
Stratton on Ash	SU	SU	SU	SU	SU	P	SNB	NS	NS	NS	NS

NS= Not surveyed SU= Site unknown at this time
S= Single bird P/ =. Pair/Number young produced U= Unknown
X= No birds present P= Pair didn't nest SI= Survey incomplete
PU= Pair next status unknown

McKelvey rating system: Spotted owl habitat managed by the BLM has been analyzed using the McKelvey rating system. The McKelvey rating system is based on a model that predicts spotted owl population based on habitat availability. Stands are examined for criteria such as canopy layering, canopy closure, snags, woody material and other features. Biological potential of a stand to acquire desired conditions is also taken in consideration. During the winter and spring of 1996, stands were visually inspected and rated into the six habitat categories. This rating system has some serious short comings and does not reflect the actual amount of habitat. Factors not considered are connectivity and fragmentation. For instance, a single acre of optimal habitat surrounded by clearcuts is as valuable in this rating system as an acre of optimal connected to hundreds of acres. Despite the short comings this system reflects the best available data at this time.

Special Status Species

Special status species are animals that are recognized by the federal or state government as needing particular consideration in the planning process, due to low populations (natural and human caused), restricted range, threats to habitat and for a variety of other reasons. This list includes species officially listed, proposed for listing. State Listed Species are those species identified as threatened, endangered, or

pursuant to ORS 496.004, ORS 498.026, or ORS 546.040. Also included are Bureau Assessment Species which are plants and animals species that are found on List 2 of the Oregon Natural Heritage Data Base and those species on the Oregon List of Sensitive Wildlife Species (ORS 635-100-040) and are identified in BLM Instruction Memo No. OR-91-57. Bureau Sensitive species are those species eligible for federal listed, state listed, or on List 1 in the Oregon Natural Heritage Data Base, or approved by the BLM state director.

Table D-5: Special Status Species Habitat Needs

SPECIES (COMMON NAME)	HABITAT ASSOCIATION	SPECIAL HABITAT FEATURE	CONCERN
Grey wolf	Generalists	Large blocks of unroaded habitat	Extirpated
White-footed vole	Riparian	Alder/mature riparian	Naturally rare, modification/loss of habitat from development
Red tree vole	Mature/old growth conifer	Mature douglas-fir trees	Declining habitat quality/quantity from logging
California red tree vole	Mature/old growth conifer	Mature douglas-fir trees	Declining habitat quality/quantity from logging
Fisher	Mature/old growth riparian	Down wood/snags	Declining habitat quality/quantity & fragmentation from logging
California wolverine	Generalists	Large blocks of unroaded habitat	Declining habitat quality/quantity & fragmentation from logging and road building, human disturbance
American martin	Mature/old growth	Down wood, living ground cover	Declining habitat quality/quantity & fragmentation
Ringtail	Generalists	Rocky terrain, caves, mine adits	Northern limit of range
Townsend's big-eared bat	Generalists	Mine adits, caves	Disturbance to nurseries, hibernacula & roosts, closing mine adits
Fringed myotis	Generalists	Rock crevices & snags	Disturbance to roosts and colonies
Yuma myotis	Generalists	Large live trees with crevices in the bark &	Limited mature tree recruitment
Long-eared myotis	Generalists	Large live trees with crevices in the bark	Limited mature tree recruitment
Long-legged myotis	Generalists	Large live trees with crevices in the bark	Limited mature tree recruitment
Pacific pallid bat	Generalists	Snags, rock crevices	General rarity/disturbance/snag loss
Peregrine falcon	Generalists	Cliff faces	Low numbers, prey species contaminated with pesticides
Bald eagle	Lacustrine/rivers	Large mature trees with large limbs near water	Populations increasing
Northern spotted owl	Mature/old growth	Late-successional mature forest with structure	Declining habitat quality/quantity & fragmentation
Marbled murrelet	Mature/old growth	Large limbed trees, high canopy closure	Declining habitat quality/quantity
Northern goshawk	Mature/old growth	High canopy closure forest for nest sites	Declining habitat quality/quantity & fragmentation, human disturbance
Mountain quail	Generalists		No concern in the watershed
Pileated woodpecker	Large trees	Large diameter snags	Snag and down log removal from logging, salvage & site prep
Lewis' woodpecker	Pine/oak woodlands	Large oaks, pines & cottonwoods adjacent to openings	Declining habitat quality/quantity fire suppression, rural & agriculture development, riparian modification
White-headed woodpecker	Pine/fir mountain forests	Large pines living and dead	Limited natural populations, logging of large pines and snags
Flammulated owl	Pine/oak woodlands	Pine stands & snags	Conversion of mixed-aged forest to even-aged forests
Purple martin	Generalists	Snags in burns with excavated cavities	Salvage logging after fire and fire suppression
Great grey owl	Pine/oak / true fir / Mixed Conifer	Mature forest with adjoining meadows	Declining quality/quantity of nesting and roosting habitat
Western bluebird	Meadows/ open areas	Snags in open areas	Snag loss/fire suppression competition with starlings for nest sites
Acorn woodpecker	Oak woodlands	Large oaks	Declining habitat quality/quantity
Tricolored blackbird	Riparian	Wetlands, cattail marshes	Limited & dispersed populations, habitat loss from development

Table D-5: Special Status Species Habitat Needs

SPECIES (COMMON NAME)	HABITAT ASSOCIATION	SPECIAL HABITAT FEATURE	CONCERN
Pygmy nuthatch	Pine forests	Large dead & decaying pine	Timber harvest of mature trees, salvage logging
Black-backed woodpecker	Pine	Snags and pine	Removal of mature insect infested trees
Williamsons sapsucker	Montane conifer forest	Trees with advanced wood decay	Removal of heart rot trees, snag removal, conversion to managed stands
Northern pygmy owl	Mixed conifer	Snags	Snag removal, depend on woodpecker species to excavate nest cavities
Grasshopper sparrow	Open savannah	Grasslands with limited shrubs	Limited habitat, fire suppression, conversion to agriculture
Bank swallow	Riparian	Sand banks near open ground or water	General rarity, declining habitat quality
Western pond turtle	Riparian/uplands	Marshes, sloughs ponds	Alteration of aquatic and terrestrial nesting habitat, exotic species introduction
Del norte salamander	Mature/old growth	Talus	Declining habitat quality/quantity & fragmentation
Siskiyou mtn. Salamander	Closed canopy forest	Talus	Declining habitat quality/quantity & fragmentation
Foothills yellow-legged frog	Riparian	Permanent streams with gravel bottoms	Water diversions, impoundments, general declines in genus numbers
Red-legged frog	Riparian	Marshes, ponds & streams with limited flow	Exotic species introduction loss of habitat from development
Tailed frog	Riparian	Cold fast flowing streams in wooded area	Sedimentation and removal of riparian vegetation due to logging, grazing & road building
Clouded salamander	Mature	Snags & down logs	Loss of large decaying wood due to timber harvest and habitat fragmentation
Variegated salamander	Riparian	Cold, clear seeps & springs	Water diversions & sedimentation from roads & logging
Black salamander	Generalists	Down logs, talus	Limited range, lack of data
Sharptail snake	Valley bottoms low elevation	Moist rotting logs	Low elevation agricultural and development projects that remove/limit down wood
California mountain kingsnake	Habitat generalists	Habitat generalists	Edge of range, general rarity, collectors
Common kingsnake	Habitat generalists	Habitat generalists	Edge of range, general rarity, collectors
Northern sagebrush lizard	Open brush stands	Open forests or brush with open understory	Edge of range, fire suppression

Other Species and Habitats

Cavity dependent species and species utilizing down logs are of special concern in the watershed. Historically, snags were produced by various processes including drought, windthrow, fires, and insects. The amount of snags fluctuated through time in response to these events. This natural process has largely been interrupted by demands for timber harvest. The potential recovery of snag dependent sensitive species such as the pileated woodpecker will depend on the ability of the federal agencies to manage this resource. Silvicultural practices have historically focused on even-aged stands and have resulted in deficits of snags and down logs in harvested areas. Other activities that have depleted snags and down logs are site preparation for tree planting (particularly broadcast burning), fuelwood cutting, post fire salvage, and previous entries for mortality salvage. Managed stands that currently contain 10-12 (5 MBF) overstory trees per acres or less are also of concern from a wildlife tree/down log perspective. Stands with remaining overstory trees have the potential to provide for current and future snag/down log requirements throughout the next rotation if existing trees are removed.

Snags and down logs provide essential nesting/denning, roosting, foraging, and hiding cover for at least

100 species of wildlife in western Oregon (Brown, *et al,* 1985). For some species, the presence or absence of suitable snags will determine the existence or localized extinction of that species. In forested stands, cavity nesting birds may account for 30%-40% of the total bird population (Raphael and White, 1984). The absence of suitable snags (snags decay stage, number and distribution) can be a major limiting factor for these snag dependent species.

The hardness (decay stage) of a snag is an important factor in determining its foraging, roosting and nesting use by individual species. Woodpeckers, like the pileated woodpecker (*Dryocous pileatus*) often choose hard snags (stage 1) for nesting where as wrens and chickadees use the softer stage 2 and 3 snags. The use of snags as a foraging substrate also changes with time and the decay stage of the snag. As a snag decomposes the insect communities found within it changes. Evans and Conner (1979) identified three foraging substrates provided by snags: the external surface of the bark, the cambium layer and the heartwood of the tree.

Snags are also used as food storage sites and as roosting/resting sites for many species. A variety of mammals, birds and some owls use snags to cache prey and other food items. Vacated nesting cavities are often used by wildlife for protection from inclement weather or on hot summer days. The marten (*Martes americana*) often use snags as resting and hunting sites and a pileated woodpecker may use up to 40 different snags for roosting.

Snags continue their function as a key element of wildlife habitat when they fall to the ground as down logs. Once again, down log use by individual species is dependent on the decay stage of the log. The larger the diameter of the log and the longer its length the more functional it is for wildlife. Depending on the decay stage of the log it will be used for lookout and feeding sites, nesting and thermal cover, for food storage or for foraging. For example, species like the clouded salamander (*Aneides ferreus*) require the micro-habitat provided by bark sloughing of the log where as small mammals such as red-backed voles (*Clethrionomys occidentalis*) burrow inside the softer logs.

Past and future management Bureau of Land Management policy, as outlined in the current Resource Management Plan (RMP), target at maintaining primary cavity nesting species at 40% of their naturally occurring population levels (biological potential). Maintaining biological potential at 40% is considered to be the minimal viable population level for any given species. By managing for primary cavity nesters at 40% biological potential we have also managed for many other snag and dependent species, such as flying squirrels (*Glaucomys sabrinus*), mountain bluebirds (*Sialia currucoides*) and Vaux's swift (*Chaetura vauxi*) at an unknown level. Managing for populations at 40% biological potential does not allow for species flexibility in adapting to changing environments or to major environmental events such as wildfire or long-term climatic change. In addition, managing at 40% biological potential does not meet BLM policy guidelines for those species where we are trying to restore, maintain and enhance existing populations (Manual 6840).

Appendix E: Fire Management Planning - Hazard, Risk, and Value At Risk Rating Classification Method and Assumptions

A. HAZARD

Hazard rating is based on the summation total points assigned based on six elements as follows:

1) Slope:

Percent	Points
0-19	5
20-44	10
45+	25

2) Aspect:

Degree	Points
316-360, 0-67	5
68-134, 294-315	10
135-293	15

3) Position On Slope

	Points
Upper 1/3	5
Mid-Slope	10
Lower 1/3	25

4) Fuel Model:

Model	Points
Grass 1, 2, 3	5
Timber 8	5
Shrub 5	10
Timber 9	15
Shrub 6	20
Timber 10	20
Slash 11	25
Shrub 4	30
Slash 12, 13	30

5) Ladder Fuel Presence:
(Use when forest vegetation has DBH of 5" or greater (vegetation condition class 6). Exceptions are possible based on stand conditions.)

	Points
Ladder fuel absent.	0
Present on less than one-third of area; vertical continuity > or < 50%.	5
Present on one-third to two-thirds percent of area; vertical continuity is <50%.	15
Present on one-third to two-thirds percent of area; vertical continuity is > 50%.	25
Present on greater than two-thirds percent of area; vertical continuity is <50%.	30
Present on greater than two-thirds percent of area; vertical continuity is > 50%.	40

6) Summary Rating:

POINTS	HAZARD RATING
0-45	LOW
50-70	MODERATE
75-135	HIGH

B. RISK

Assigned based on human presence and use, and on lightning occurrence.

High rating when human population areas are present on or adjacent within 1/4 mile of the area; area has good access with many roads; relatively higher incidence of lightning occurrence; area has high level of human use.

Moderate rating when area has human access and experiences informal use; area is used during summer and fall seasons as main travel route or for infrequent recreational activities. Lightning occurrence is typical for the area and not notably higher.

Low rating when area has limited human access and infrequent use. Baseline as standard risk, mainly from lightning occurrence with only rare risk of human fire cause.

C. VALUE AT RISK

Best assigned through interdisciplinary process. Based on human and resource values within planning areas. Can be based on land allocations, special use areas, human improvements/monetary investment, residential areas, agricultural use, structures present, soils, vegetation conditions, and habitat.

Examples:

High rating - ACEC, RNA, LSR, Special Status species present, critical habitats, recreation area, residential areas, farming, vegetation condition and McKelvey Ratings of 81, 82, 71, 72; vegetation condition of 4 and 5. Caves, cultural, or monetary investment present. Riparian areas.

Moderate rating - Granitic soils, informal recreation areas and trails. Vegetation and McKelvey Rating of 85, 75, 65.

Low rating - Vegetation condition class 1, 2, 3; and vegetation 5, 6, 7 with McKelvey Rating 4.